Final report

OWMC
Ontario
Waste Management
Corporation

A provincial crown corporation

ier
Institute of
Environmental
Research Inc.

Clayton Research Associates Limited
Economic Consultants

SITE SELECTION PROCESS

PHASE 4A:
SELECTION OF A PREFERRED SITE(S)

Economic Base Analysis

Prepared for:

Ontario Waste Management Corporation

by

Clayton Research Associates Limited

December, 1985

Clayton Research Associates Limited
Economic Consultants

Please reply to: Toronto Office December 9, 1985

Dr. Peter Homenuck
President
Institute of Environmental Research Inc.
81 Sheppard Avenue West
Suite 201
Willowdale, Ontario
M2N 1M4

Dear Sir:

Re: Final Report: SITE SELECTION PROCESS PHASE 4A: SELECTION OF A PREFERRED SITE(S) - ECONOMIC BASE ANALYSIS

We are pleased to submit the final report for the above noted study. The report documents the analysis of the economic base factors during Phase 4A of the site selection process.

Yours truly,

CLAYTON RESEARCH ASSOCIATES LIMITED

Frank Clayton
Frank A. Clayton, Ph.D
President

FC:km

Enclosures

Toronto Office Suite 1, 2900 Eglinton Avenue East, Scarborough, Ontario M1J 2E4 Tel. (416) 431-5570
Calgary Office Suite 302, 14500 Bannister Road, S.E., Mailing Address: Box 181, Midnapore, Calgary, Alberta T0L 1J0 Tel. (403) 256-6919
Edmonton Office Suite 2302, 9925 Jasper Avenue, Edmonton, Alberta T5J 2X5 Tel. (403) 426-0750
Vancouver Office Suite 710, 1050 West Pender Street, Vancouver, B.C. V6E 3S7 Tel. (604) 681-0776

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY i

Purpose of the Report i
Scope and Method ii
Premises and Postulates iv
Status of Data vi
Basic Acceptability Analysis viii
Ranking of Economic Base Impact Factors viii
Main Findings ix
Conclusions and Recommendations xiii

CHAPTER 1: INTRODUCTION 1

1.1 Purpose 1
1.2 Background 3
1.3 Relationship to the Site Selection Process 6
1.4 Approach 8
1.5 Organization of the Report 12

CHAPTER 2: FRAMEWORK FOR ECONOMIC BASE IMPACT ANALYSIS 15

2.1 Purpose 15
2.2 Factor Description 15
2.3 Methodology and Assumptions 22
2.4 Data Collection and Analysis 38
2.5 Summary 47

CHAPTER 3: THE ECONOMIC BASE ENVIRONMENT 49

3.1 Purpose 49
3.2 Community and Regional Economic Base Characteristics - Region of Niagara 50
3.3 Community and Regional Economic Base Characteristics - Region of Halton 60
3.4 Market Value of Properties in the Site Vicinity 66
3.5 Businesses In the Site Vicinity of OWMC Facilities 68

CHAPTER 4: BASIC ACCEPTABILITY 71

CHAPTER 5: COMPARATIVE EVALUATION PROCESS 73

5.1 Purpose 73
5.2 Siting Options Under Consideration 74
5.3 Statement of General Assumptions 76
5.4 Overview of the Comparative Evaluation Process . 78
5.5 Data Sources 81
5.6 Screening of Factors, Indicators and Sub-Indicators 81

TABLE OF CONTENTS (continued)

Page

5.7 Modifications to Factors, Indicators and Sub-Indicators 84
5.8 Scaling of Indicators and Sub-Indicators 86
5.9 Ranking of Indicators and Sub-Indicators 88
5.10 Indicator Scoring and Aggregation 91
5.11 Factor Suitability Levels 94
5.12 Factor Ranking 95
5.13 Factor Scoring and Aggregation 102
5.14 Comparison and Ranking of Siting Options 106

CHAPTER 6: SENSITIVITY ANALYSIS AND POTENTIAL FOR MITIGATION 111

6.1 Purpose 111
6.2 Sensitivity Analysis 112
6.3 Potential for Mitigation 129
6.4 Conclusion 130

LIST OF REFERENCES 133

APPENDICES

APPENDIX A: Factor Sheets
APPENDIX B: Description of Business Survey
APPENDIX C: Description of Property Value Impact Estimates
APPENDIX D: Description of Employment Impact Estimates
APPENDIX E: Description of Household Impact Estimates
APPENDIX F: Description of Industrial Impact Analysis
APPENDIX G: Contacts

EXECUTIVE SUMMARY

PURPOSE OF THE REPORT

The purpose of this report is to document the economic base component of the comparative evaluation of candidate siting options. This report introduces economic base impacts as one of the factors being utilized by OWMC as input into the site selection process.

In this report, the economic base impact factors and their associated indicators and sub-indicators of economic base impacts are defined; the rationale for the selection, and a ranking of the significance, of the factors and indicators are presented; a data summary and method of analysis are presented; and the ranking of the siting options, together with a sensitivity analysis of the effect of varying key assumptions on the ranking, are presented. The economic base impacts estimated in this report are utilized in the overall site evaluation process which is detailed in M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

The identification of economic base factors and the economic base impact analysis excludes agricultural and tourism impacts and impacts on businesses along access roads as these considerations were being examined by other members of the site selection team, and were beyond the scope of this analysis. A composite of the economic base impacts identified in this economic base impact analysis, in the agriculture impact analysis and in the tourism impact analysis is presented in an appendix to the overall site selection report undertaken by M.M. Dillon Limited. Thus, the economic base impact analysis undertaken in this report is only a partial review of the potential economic base impacts of OWMC facilities.

The analysis is limited to the potential impacts of these facilities on employment, households, property values and business activity on-site, in the site vicinity and in the local community (area municipality).

SCOPE AND METHOD

The objective of the economic base impact analysis is to compare the six siting options for OWMC facilities from the perspective of five economic base impact factors. The emphasis is on the relative difference in impact among the siting options, not the absolute impacts of OWMC facilities.

The economic base impact factors and study areas to which they apply are outlined below:

SITE

- Displacement of Business Activity.

SITE VICINITY

- Property Value Impacts.
- Business Activity Positively Affected by the Presence of OWMC Facilities.
- Business Activity Negatively Affected by the Presence of OWMC Facilities.

COMMUNITY AND REGIONAL

- Community and Regional Economic Base.

The overall economic base impact is measured by the community and regional economic base factor. The indicators for this factor measure the impact of OWMC facilities on levels of employment, household growth and perceptions of community economic impact. Employment impacts are estimated from a detailed economic base analysis of the candidate regional municipalities. Regional household growth estimates are derived by apportioning the regional employment growth into a resident and non-resident population and applying household formation assumptions to these population estimates. Area municipal household growth estimates are derived through an analysis of work-related commuting patterns of residents and employees in the candidate area municipality. A third indicator - perceptions of community economic impact - is derived from a survey of business operators conducted by Clayton Research Associates.

The displacement of business activity factor is estimated using three indicators: number of businesses displaced; number of employees displaced; and the annual sales of businesses displaced. Two site vicinity factors, which estimate business activity either positively or negatively affected by the presence of OWMC facilities, rely on similar indicators to estimate these impacts. These impacts were estimated using data from the business survey conducted by Clayton Research Associates.

The property value impacts factor is estimated from data on site vicinity properties obtained from municipal assessment rolls for which market values are calculated using Ministry of Revenue guidelines. The negative impacts of OWMC facilities on these market values are estimated through a review of case studies.

The determination of access roads, rail access and site boundaries for OWMC facilities were established for each siting option independent to the economic base impact analysis being undertaken. Of these siting option characteristics, access roads and rail access are outside the scope of the economic base impact analysis. The definition of site boundaries is, however, an important consideration in the determination of site and site vicinity economic base impacts.

PREMISES AND POSTULATES

PREMISES

The following assumptions, which have been agreed upon by the site selection team or were provided by other site selection team members or OWMC, have been incorporated into the comparative evaluation analysis of economic base impacts:

- Only economic base impacts that varied from one siting option to another are to be examined.

- Agricultural and tourism considerations are to be analyzed and evaluated as separate factors in the site selection process and are not to be included in the economic base impact analysis, except as qualitative considerations in the ranking of siting options.

- The facilities consist of an incinerator, a physical/chemical treatment and solidification plant and an engineered landfill.

- All treated wastes will be solidified and deposited in the engineered landfill.

- Economic base impacts are calculated for facilities with a capacity to process 300,000 tonnes of special wastes per year.

- Direct employment at OWMC facilities is expected to range from 217 to 221 employees depending upon the siting option.

- Property boundaries for OWMC facilities were recommended by the site selection team. The estimated area of each siting option is as follows:

LF-3C	206 hectares
LF-9C	135 hectares
LF-1E	273 hectares
LF-1E/PI-27E	323 hectares
LF-4N/PI-1N	343 hectares
LF-4N/PI-13N	338 hectares

POSTULATES

The following assumptions have been made by Clayton Research Associates in the comparative evaluation analysis of economic base impacts:

- Economic base impacts are estimated using 1984 as a base year.

- There will be no industrial spin-off associated with OWMC facilities (i.e., no new firms will locate near OWMC facilities due to the services or products provided by the facilities).

- The impact of OWMC facilities on area and regional household growth will be directly related to regional employment growth. The allocation of household growth to candidate area municipalities is derived from existing commuting patterns of employees within that municipality and within the candidate regional municipality.

- Negative property value impacts in the site vicinity will decline with distance from the facilities site and will differ by type of property.

STATUS OF DATA

DATA SOURCES

Data gathered on business activity displacement and on business activity positively or negatively affected by the presence of OWMC facilities were obtained through the business survey conducted by Clayton Research Associates (details of that survey are provided in Appendix B). The response rate to the survey exceeded 90 percent in both West Lincoln and Milton. The response rate in Niagara Falls, although lower, was also quite high and exceeded 80 percent.

Data on the assessed value of properties in the site vicinity of each siting option were obtained from the municipal assessment rolls of the candidate municipalities. The derivation of the market value of these properties was based on assessment information obtained from the Ministry of Revenue. The estimation of the negative property value impacts resulting from OWMC facilities was made from a review of data on property value impacts from case studies of similar facilities.

Data used in the estimation of the employment and household growth indicators for the community and regional economic base factor were obtained from employment and industrial sector information from Statistics Canada and from data on commuting patterns from the 1981 Census of Canada. Data for the remaining indicator - perceptions of community economic impact - were obtained from the business survey conducted by Clayton Research Associates.

DATA LIMITATIONS

The data presented for business activity displacement is regarded as quite accurate and provides a good measure of on-site economic impacts.

The estimation of the impacts of OWMC facilities on site vicinity property values was limited by the availability of data regarding the property value impacts associated with these types of facilities. Furthermore, it should be noted that any initial negative property value impacts could decrease over time as the public perception of OWMC facilities changes and the facilities become an accepted part of the local economy.

The data provided by respondents to the business survey were checked for consistency among similar respondents. Since the question regarding the (positive or negative) impact of OWMC facilities on existing businesses and the community economy is largely dependent upon a reasonable perception of the nature of the facilities, which can only be gained once the facilities are in operation, it is difficult to determine the accuracy of the response to this question. The data collected for the indicators of these factors (number of businesses, number of employees and annual sales) are, however, considered accurate and reliable.

The data obtained on industrial structure, employment, unemployment rates and commuting patterns are considered accurate and reliable for the analysis undertaken in this study.

For the overall economic base impact analysis, it is concluded that the available data was adequate to compare and evaluate siting options. It is also concluded that data limitations could be further addressed in Phase 4B of the site selection process.

BASIC ACCEPTABILITY ANALYSIS

Prior to commencing the comparative evaluation of siting options for economic base impacts, a basic acceptability analysis was undertaken to determine if there were any severe economic base constraints or characteristics of the candidate municipalities that would render any siting option unacceptable for OWMC facilities. A basic acceptability analysis was undertaken by each site selection team consultant in Phase 4A of the site selection process to cover the wide range of factors under consideration. For the economic base analysis, none of the factors under consideration imposed severe enough constraints on any of the candidate municipalities to warrant that siting option being removed from the comparative evaluation process. As a result of the basic acceptability analysis undertaken by other site selection team consultants, however, a decision was made by OWMC to drop candidate site LF-2N in the City of Mississauga from further consideration because the site could not ensure the natural containment of the planned engineered landfill.

RANKING OF ECONOMIC BASE IMPACT FACTORS

Since all factors do not have the same importance and impact, risk or cost, it was necessary to establish rankings (or weights) for each factor. An initial ranking of economic base impact factors ranging from 1 to 10 was established by Clayton Research Associates. A factor rank of 1 represents the least important impact in the comparative evaluation and a factor rank of 10 would be assigned to those factors having the greatest importance in the analysis. Following the data analysis and public meetings, some of the factor rankings were revised. The factor rankings used in this analysis are as follows:

SITE

° Displacement of Business Activity	4

SITE VICINITY

° Property Value Impacts	7
° Business Activity Positively Affected by the Presence of OWMC Facilities	4
° Business Activity Negatively Affected by the Presence of OWMC Facilities	6

COMMUNITY AND REGIONAL

° Community and Regional Economic Base	8

MAIN FINDINGS

The economic base impact analysis produced the following findings for submission to the site selection team:

RANKING OF SITING OPTIONS

The six siting options which were compared for economic base impacts are ranked from the most preferred to least preferred as follows:

LF-9C
LF-1E
LF-1E/PI-27E
LF-3C
LF-4N/PI-1N
LF-4N/PI-13N

Siting options LF-9C in West Lincoln and LF-1E and LF-1E/PI-27E in Niagara Falls are siting options which are expected to have an overall positive impact (using the selected economic base factors considered in this report) on the economic base of the candidate municipalities. The ranking of these three siting options is very close and, as shown in the sensitivity analysis, the ranking can vary with changes to the underlying assumptions. The overall economic base impacts for the remaining three siting options are estimated to be negative.

Siting option LF-9C is the most preferred siting option because there are very few associated negative economic base impacts: no businesses would be displaced by the location of OWMC facilities on this siting option and there are very few businesses in the site vicinity which could be negatively affected. The positive impact estimated for the community and regional economic base factor is large enough to result in an overall positive impact and the preferred ranking for this siting option.

The two siting options in Niagara Falls, LF-1E and LF-1E/PI-27E, have virtually the same economic base impacts (in total). When all economic base factors under consideration in this report are combined, the overall impact of OWMC facilities located on either siting option is slightly positive. Siting option LF-1E, unlike LF-9C, has measurable economic activity. There is a moderate displacement of business activity and a moderate negative property value impact. These negative impacts are offset by a high positive impact estimated for the community and regional economic base factor.

Siting option LF-1E/PI-27E, because it combines two sites, has much higher negative property value and displacement of business activity impacts than does integrated site LF-1E. Despite this, it is ranked very close to LF-1E due to the relatively large number of businesses within the site vicinity of PI-27E that would be positively affected by OWMC facilities (including the Ford Motor Company glass plant, Cyanamid Canada Inc. and B.F. Goodrich).

Siting option LF-3C is similar to LF-9C in that the local economy is largely agriculturally based. As a result, the negative impacts of OWMC facilities on property values are small, there is no displacement of business activity and the positive impact on the community and regional economic base is moderate. The major difference which separates the ranking of LF-3C from LF-9C is the inclusion of a private school under the business activity negatively affected factor. This school has a budget in excess of $1.1 million and has 42 employees and the potential negative impact of the facilities on this school is sufficient to rank this option as the fourth most preferred.

The overall economic base impacts of the two Milton siting options are strongly negative. Siting options LF-4N/PI-1N and LF-4N/PI-13N have large negative property value impacts (largely because two sites are required) and a large negative impact on existing businesses in the site vicinity (i.e., horse breeding and nursery orchard operations). An important element in the ranking of these siting options are the few site vicinity businesses positively affected by the presence of OWMC facilities.

SENSITIVITY ANALYSIS

The ranking of siting options according to their economic base impacts is affected by varying key underlying assumptions. Sensitivity tests were conducted for: facilities having a treatment capacity of 150,000 tonnes; larger negative property value impacts with household out-migration; no negative property value impacts; a partial solidification with evaporation scenario; a scenario whereby OWMC facilities generate spin-off industry (ultimately resulting in an additional 200 regional jobs); a scenario with revised site boundaries for LF-3C and LF-1E; a scenario with alternative factor rankings; a scenario with alternative indicator and sub-indicator rankings; and a future scenario option.

The ranking of the preferred siting option in the base case scenario (LF-9C) is changed by removing the assumption regarding negative property value impacts from the analysis and by altering the factor weights to lower the importance of negative impacts (on the assumption that mitigative measures are undertaken by OWMC to reduce these negative impacts). In both instances, LF-1E/ PI-27E becomes the preferred siting option and LF-9C the second most preferred. There are also minor changes in the ranking of other siting options under both these alternative scenarios: LF-1E becomes the third most preferred siting option for economic base factors rather than the second; the ranking of LF-3C changes from 4 to 5 when no negative property value impacts are assumed; and LF-4N/ PI-1N changes from 5 to 4. In each sensitivity test, siting option LF-4N/PI-13N remains the least preferred.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The economic base impact analysis undertaken in this report is sufficient to compare alternative siting options for OWMC facilities in order to select a preferred siting option. The sensitivity analysis shows that the ranking of the siting options is sensitive to changes in assumptions regarding property value impacts. If negative property value impacts are removed through mitigative measures, siting option LF-1E/PI-27E in Niagara Falls becomes the most preferred siting option for the economic base factors. The other sensitivity tests undertaken (which are discussed in Chapter 6) did not change the ranking of the preferred siting option for economic base factors (LF-9C in West Lincoln).

RECOMMENDATIONS

Phase 4B of the site selection process, the detailed evaluation of the preferred siting option, should examine more specifically and in greater detail: the potential for OWMC facilities to generate spin-off industries; employment impacts of OWMC facilities on the agriculture and tourism industries in the area and regional municipality of the preferred siting option; the employment multiplier arising from OWMC facilities during the operation phase; the employment multiplier arising during the construction phase; the income multipliers arising from increased municipal wages and changes in municipal revenues and operating costs; and case studies of economic base impacts from similar facilities.

CHAPTER 1

INTRODUCTION

1.1 PURPOSE

The purpose of this report is to document the economic base component of the comparative evaluation of candidate siting options. This report introduces economic base impacts as one of the factors being utilized by OWMC as input into the site selection process.

This report: (1) identifies five economic base factors and a number of indicators for estimating economic base impacts;* (2) describes the economic structure of the five municipalities - three area and two regional municipalities - where siting options have been selected for the possible location of OWMC facilities;** and (3) documents the analysis of impacts of OWMC facilities on the economic base of these municipalities.

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* A factor represents a positive or negative consideration which assists in comparing siting options. Factors refer to risks, impacts or engineering cost considerations. A siting option refers to the site or combination of sites required to accommodate all OWMC facilities (i.e., the landfill, incinerator and physical/chemical treatment and solidification plant). An integrated siting option involves all facilities on one site.

** The area municipalities are the Town of Milton, the City of Niagara Falls and the Township of West Lincoln; the regional municipalities are the Regions of Halton and Niagara. An eighth site in the City of Mississauga, LF-2N, has been dropped by OWMC from consideration because the site could not ensure the natural containment of the planned engineered landfill. See M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Interim Site Selection Report, Candidate Site LF-2N, 1985.

The ranking of siting options by economic base impacts is one component of the overall Phase 4A site selection process. In the overall site selection process, a large number of factors are combined to arrive at the preferred siting option. These factors cover a wide range of considerations, including several risk considerations (e.g., transportation, air quality, hydrogeologic suitability, surface water suitability), environmental impact considerations (e.g., residents, businesses, community and recreation features, natural environment, air dispersion/air quality, community and regional, land use, agricultural resources) and engineering cost considerations (e.g., overall facilities costs, site area for facilities placement). The five economic base factors fall under the community and regional factor grouping as part of the potential environmental impact.*

Three site selection goals have been established by OWMC to guide the site selection process. In order of importance, these are:

- To minimize risk to human health;
- To minimize environmental impact; and
- To minimize financial costs to OWMC and the people of Ontario.

The economic base factors include both positive and negative impacts on the candidate municipalities. The positive impacts of OWMC facilities include an increase in both employment and household growth as well as business operations whose activities could be positively affected by OWMC facilities. The negative impacts include on-site displacement of business activity, negative property value impacts in the site vicinity and any negative impacts on local businesses and the community economy. All of these potential impacts are discussed in this report.

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* M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

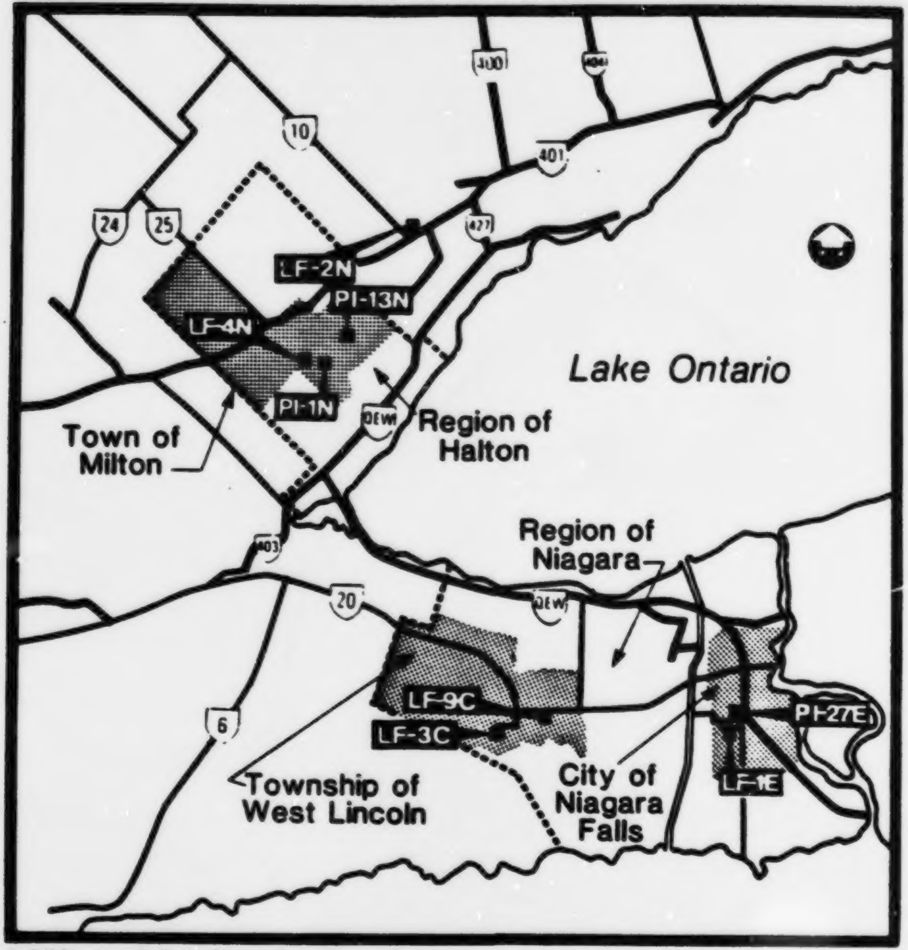
The five municipalities discussed in this report are referred to as candidate municipalities. Their locations, along with the location of the six siting options under consideration, are shown on Figure 1.

1.2 BACKGROUND

The identification of the preferred siting option for OWMC facilities, which is the objective of Phase 4A of the site selection process, builds on the earlier process of identification of candidate sites in Phase 3. Economic base impacts were not considered in earlier phases of this site selection process and are being introduced into the Phase 4A analysis (along with a number of other considerations) due to the need for site specific comparisons. For this reason, this report contains a considerable amount of data and background on the economic base of the candidate municipalities, both in the main body of the report and in the appendices. This report forms the basis for presenting data for the economic base component under consideration in the site selection process.

Some of the data used in the economic base impact analysis were obtained from other Phase 4A studies. Linkages between the economic base impact analysis and other Phase 4A studies are outlined in Table 1.

Figure 1 **CANDIDATE MUNICIPALITIES AND GENERAL LOCATION OF SITING OPTIONS**


400
404
10
401
24
25
427
LF-2N
PI-13N
LF-4N
PI-1N
Lake Ontario
QEW
Town of Milton
Region of Halton
403
Region of Niagara
20
QEW
LF-9C
LF-3C
6
PI-27E
LF-1E
Township of West Lincoln
City of Niagara Falls

NOTE: Symbols indicate location only, and not size or shape of sites

LEGEND

■	Candidate Sites
━━	400 Series Highways
——	Other Highways and Roads
LF	Landfill, Integrated Facilities
PI	Physical/Chemical Treatment Plant and Incineration

Miles 0 10

Kilometers 0 10

SOURCE: OWMC, 1985.

TABLE 1

LINKAGE OF THE ECONOMIC BASE STUDY TO OTHER PHASE 4A STUDIES

Study	Consultant	Relationship to Economic Base Study
Agricultural Impacts	Ecologistics Limited	- Ecologistics provided base maps of the siting options and an inventory of properties on the municipal assessment rolls - Ecologistics provided a list of agri-businesses
Analysis of Official Plans	Leon Kentridge and Associates Limited (LKA)	- LKA provided input into future scenario projections - LKA provided assessors' reports on the candidate sites - Clayton Research provided information on industrial growth and development
Engineering	Monenco Limited	- Monenco provided a variety of technical data regarding facilities characteristics
Municipal Finance and Services Analysis	Clayton Research Associates	- the Economic Base Analysis provided input to this study on household growth and the property value impacts of each siting option
Site Selection	M.M. Dillon Limited	- Dillon provided overall direction and co-ordination during the site selection process
Social Impacts	Institute of Environmental Research Inc. (IER)	- IER provided data from their portion of the "Walk and Talk Program" on the number of households that indicated they would move due to OWMC facilities and a list of home-businesses - IER (Howard Stafford) provided information on OWMC facilities industrial spin-off potential - IER provided input into future scenario projections - Clayton Research provided household projections
Tourism Impacts	Laventhol & Horwath (L&H)	- L&H provided estimates of the impacts of OWMC facilities on tourism and related employment for each candidate municipality

1.3 RELATIONSHIP TO THE SITE SELECTION PROCESS

OWMC has adopted a five-phase site selection process. The first phase was the narrowing of the site search to a single large geographic region in Ontario. In Phase 2, candidate areas within this large region were identified. In Phase 3, candidate sites within these candidate areas were selected. In Phase 4A, the current phase of work, siting options are compared and the preferred siting option selected. In the next stage (Phase 4B), a detailed testing of the preferred siting option will occur. The final phase of the site selection process involves public hearings.

In comparing and contrasting the siting options during the current Phase 4A work, Clayton Research Associates has responsibilities in two areas: (1) the analysis of some of the potential economic base impacts of OWMC facilities; and (2) the analysis of the potential municipal finance impacts (including impacts on municipal services) of OWMC facilities.* This economic base report provides estimates of employment and household growth, business displacement, property value impacts and community economic base impacts associated with OWMC facilities. Data were obtained from other site selection consultants including the cost of the facilities, the site area of the facilities and estimates of out-migration in candidate municipalities which could occur due to OWMC facilities.

Five economic base factors are identified in this comparative evaluation:

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* The municipal finance and services analysis is contained in a separate report: Clayton Research Associates, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Municipal Finance and Services Analysis, 1985.

- Displacement of business activity: This factor relates to the business activity that would be displaced under each OWMC siting option. The number of businesses, the number of employees and annual sales are used to indicate the amount of business activity that would be displaced from each site.

- Property value impacts: This factor estimates the magnitude of the negative property value impacts caused by OWMC facilities that might be expected in the vicinity of each siting option.

- Business activity positively affected by the presence of OWMC facilities: This factor relates to business operations in the site vicinity of each siting option that could be positively affected by the presence of OWMC facilities. Businesses include commercial and industrial establishments, home- and agri-businesses as well as tourist and recreational businesses.* The number of these businesses as well as their employment and sales levels are considered.

- Business activity negatively affected by the presence of OWMC facilities: This factor relates to business operations in the site vicinity of each siting option that could be negatively affected by the presence of OWMC facilities. The business types and characteristics considered are the same as for the previous factor.

- Community and regional economic base: This factor relates to the overall impact of OWMC facilities on the community and regional economy. The impacts considered include impacts on employment and households as well as the perception of a segment of the local business community as to the possible economic impact of OWMC facilities on their community. This factor excludes, however, the agriculture and tourism impacts that OWMC facilities could have on the economies of the candidate municipalities.*

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* These business types are defined in Appendix B, pages B-3 to B-5.

Figure 2 illustrates the relationship of the economic base factors to the broad spectrum of factors being considered in Phase 4A of the site selection process. As previously stated, this factor is part of the general grouping of factors which pertain to environmental impacts.

1.4 APPROACH

The general approach to Phase 4A of the site selection process is illustrated in Figure 3.** For the comparative evaluation of the economic base factors, the following steps were involved:

- Identification of factors, indicators and sub-indicators.

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[*] The analysis of agriculture impacts is the responsibility of Ecologistics Limited. See Ecologistics Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985. For tourism impacts, see Institute of Environmental Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Social Analysis, Appendices, Volume 4, Tourism Impacts, prepared by Laventhol & Horwath. With the exception of farm businesses displaced on-site and farm and business property value impacts in the site vicinity, both agriculture and tourism impacts are outside the scope of the economic base analysis in this report. These economic base impacts from the agriculture and tourism studies are combined with the impacts estimated in this report in an appendix in the overall site evaluation report prepared by M.M. Dillon Limited.

[**] For a more detailed description of the Phase 4A site selection process, see M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

FIGURE 2

ECONOMIC BASE FACTORS IN THE COMPARATIVE EVALUATION OF FACILITY SITING OPTIONS

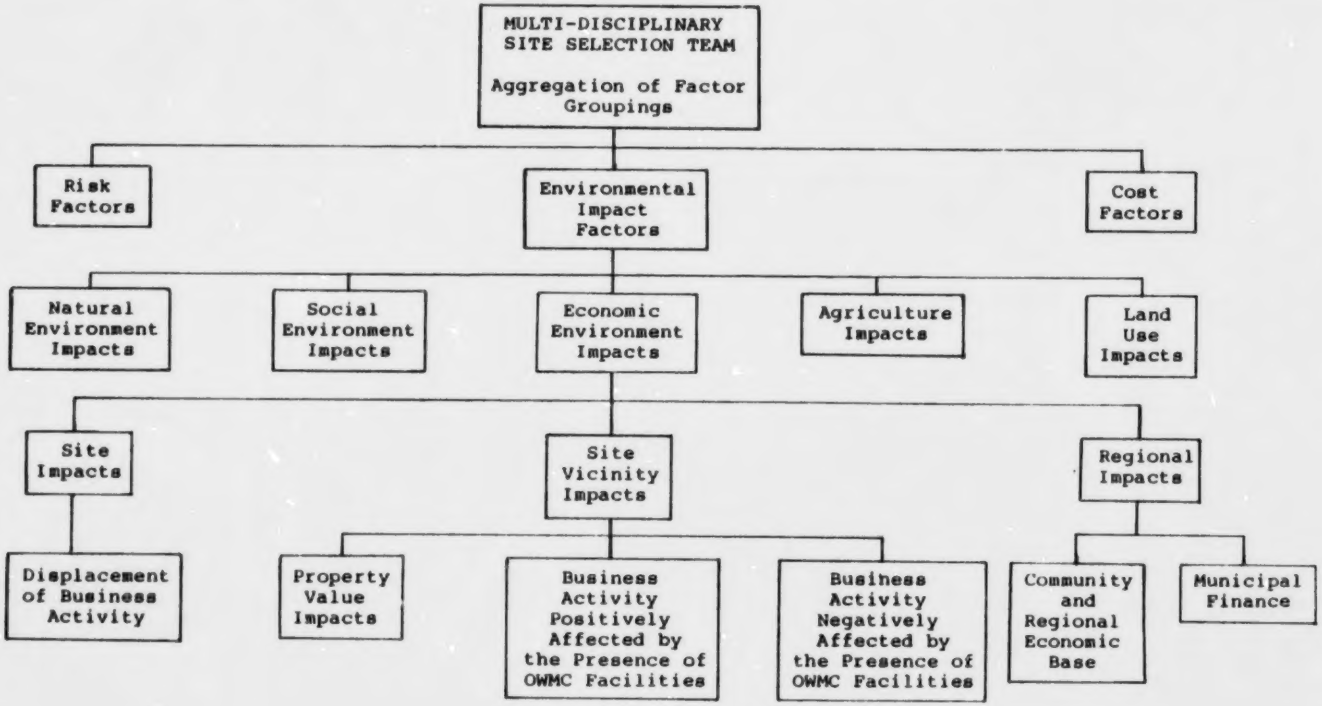
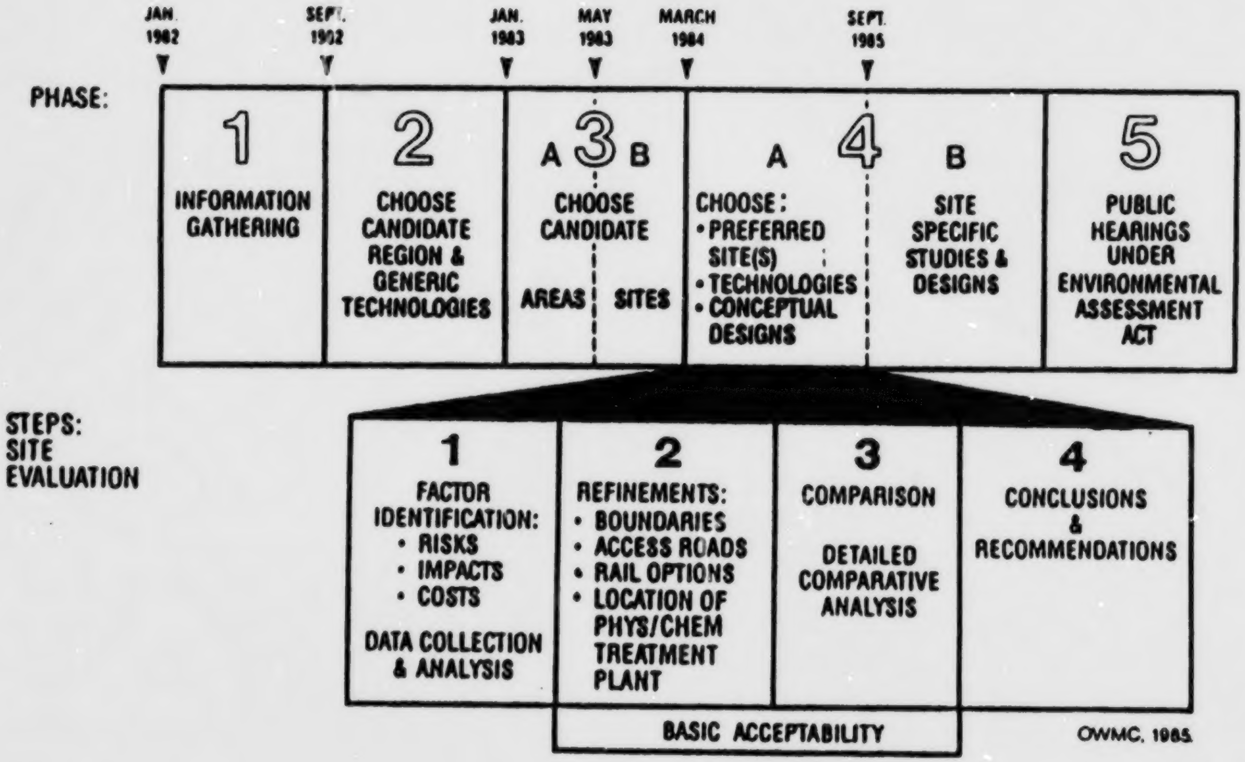

MULTI-DISCIPLINARY SITE SELECTION TEAM
Aggregation of Factor Groupings
Risk Factors
Environmental Impact Factors
Cost Factors
Natural Environment Impacts
Social Environment Impacts
Economic Environment Impacts
Agriculture Impacts
Land Use Impacts
Site Impacts
Site Vicinity Impacts
Regional Impacts
Displacement of Business Activity
Property Value Impacts
Business Activity Positively Affected by the Presence of OWMC Facilities
Business Activity Negatively Affected by the Presence of OWMC Facilities
Community and Regional Economic Base
Municipal Finance

FIGURE 3

FACILITIES DEVELOPMENT PROCESS


PHASE:
JAN. 1982
SEPT. 1982
JAN. 1983
MAY 1983
MARCH 1984
SEPT. 1985
1
INFORMATION GATHERING
2
CHOOSE CANDIDATE REGION & GENERIC TECHNOLOGIES
A 3 B
CHOOSE CANDIDATE
AREAS
SITES
A 4 B
CHOOSE:
• PREFERRED SITE(S)
• TECHNOLOGIES
• CONCEPTUAL DESIGNS
SITE SPECIFIC STUDIES & DESIGNS
5
PUBLIC HEARINGS UNDER ENVIRONMENTAL ASSESSMENT ACT
STEPS: SITE EVALUATION
1
FACTOR IDENTIFICATION:
• RISKS
• IMPACTS
• COSTS
DATA COLLECTION & ANALYSIS
2
REFINEMENTS:
• BOUNDARIES
• ACCESS ROADS
• RAIL OPTIONS
• LOCATION OF PHYS/CHEM TREATMENT PLANT
3
COMPARISON
DETAILED COMPARATIVE ANALYSIS
4
CONCLUSIONS & RECOMMENDATIONS
BASIC ACCEPTABILITY

OWMC, 1985

- Data collection.

  Economic base data were collected for each candidate municipality from: (1) a business survey conducted by Clayton Research Associates on-site and in the site vicinity of each siting option; (2) case studies of property value impacts (of non-compatible land uses) and economic base studies; and (3) statistics on the industrial structure of the candidate municipalities and the commuting patterns of resident employees.

- Data analysis.

  Data gathered from the business survey were compared to other data sources and checked for consistency. Data on economic base characteristics were utilized, using a location quotient technique, to estimate employment multipliers for each of the candidate regional municipalities and household growth for the candidate area and regional municipalities. These estimates differed by siting option due to the differences of each candidate site and the diverse economic base of each municipality.

- Basic acceptability analysis.

  The siting options were tested for any severe constraints for economic base impacts.

- Detailed comparative evaluation.

  The economic base impacts of each siting option were then predicted and the siting options compared.

- Ranking of siting options.

Siting options were ranked according to their economic base impacts and qualitative impacts were introduced for consideration.

- Sensitivity analysis.

The sensitivity of the ranking of siting options was tested by varying several assumptions. The effect of selected mitigative actions were also introduced.

1.5 ORGANIZATION OF THE REPORT

This report is divided into six chapters:

- Chapter 2, Framework for Economic Base Impact Analysis, outlines and defines the factors, indicators and sub-indicators used in the comparative evaluation process, describes the key parameters of the economic base impact analysis and provides a summary of the data analysis undertaken.

- Chapter 3, The Economic Base Environment, highlights the economic base characteristics of the candidate municipalities and summarizes how these characteristics affect the comparative evaluation process.

- Chapter 4, Basic Acceptability, discusses whether there are any severe economic base constraints or characteristics of the candidate municipalities that would render any siting option unacceptable for OWMC facilities.

- Chapter 5, Comparative Evaluation Process, outlines the process and the results of the comparison of the siting options for the economic base factors. The six siting options are ranked from most preferred to least preferred.

- Chapter 6, Sensitivity Analysis and Potential for Mitigation, examines the sensitivity of the siting option rankings to selected alternative assumptions and briefly looks at possible methods of reducing the more significant negative economic base impacts through specific mitigative actions undertaken by OWMC.

In addition, there is a list of references which is followed by seven appendices:

- Appendix A, Factor Sheets, provides a description of the economic base factors and their associated indicators.
- Appendix B, Description of Business Survey, provides an overview of the business survey conducted by Clayton Research Associates on-site and in the site vicinity of each siting option.
- Appendix C, Description of Property Value Impact Estimates, reviews several case studies of the property value impacts associated with incompatible land uses and presents the assumptions and analysis of expected impacts of OWMC facilities on property values in the site vicinity of each siting option.
- Appendix D, Description of Employment Impact Estimates, provides the details for the calculation of the employment multipliers used in the economic base impact analysis.
- Appendix E, Description of Household Impact Estimates, describes the procedures used to convert the regional employment estimates into estimates of additional households expected to

reside in the area and regional municipalities of each siting option.

- Appendix F, Description of Industrial Impact Analysis, presents an analysis of the potential for industrial spin-offs from OWMC facilities (including an addendum paper by Dr. Howard Stafford entitled "Hazardous Waste Management Facility Siting and the Location of Related Economic Activites") and an analysis of industrial land demand and supply in the three area municipalities.

- Appendix G, Contacts, provides a list of the persons contacted during the course of the research for the economic base impact analysis.

CHAPTER 2

FRAMEWORK FOR ECONOMIC BASE IMPACT ANALYSIS

2.1 PURPOSE

The objective of the economic base impact analysis, in relation to the site selection process, is to ascertain the economic base impacts which could result from OWMC facilities under each siting option. The results of this analysis, in turn, are inputs into the comparison, evaluation and ranking of siting options.

This chapter describes the framework which is utilized in the analysis of selected economic base impacts. The next section provides a description of the factors, indicators and sub-indicators used in the economic base impact analysis. The third section describes the assumptions and methodology used in this analysis. The fourth section presents a summary of the data collection and analysis undertaken. The concluding section summarizes how this framework is utilized in the remainder of the report.

2.2 FACTOR DESCRIPTION

This section discusses the five economic base factors considered in the economic base impact analysis and the linkage between these factors and their component indicators and sub-indicators.

2.2.1 DEFINITION OF FACTORS, INDICATORS AND SUB-INDICATORS

A factor represents a positive or negative consideration which, because it varies from one siting option to another, assists in the comparison of siting options.* A factor may be divided into two or more indicators and an indicator, in turn, may be divided into two or more sub-indicators, to more precisely estimate differences in impacts among siting options.

Economic base factors vary substantially with respect to the degree to which they can be quantified. Three types of economic base impacts are considered in this report: (1) impacts that can be precisely measured; (2) impacts that can be measured by a relative comparison (e.g., the number of households generated by OWMC facilities); and (3) impacts which are perceived impacts (e.g., the number of business operators expecting a negative impact on their business resulting from OWMC facilities) and which may or may not materialize.

Any qualifications regarding the estimation of these impacts are taken into account in the ranking of importance of factors, indicators and sub-indicators in the overall estimation of the economic base impacts of OWMC facilities.

The objective of identifying economic base factors was to ensure coverage of the wide range of economic base impacts associated with OWMC facilities during the comparison of siting options. Since tourism and agriculture economic base impacts are being considered by other members of the site selection team, the analysis in this report is limited to the potential impacts of OWMC facilities on property values and business activity in the site vicinity and industrial, retail, service and residential economic activities in the community and region.

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* For technical descriptions of factors and indicators, see M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

The following three considerations led to the identification of five economic base impact factors:

- The degree to which economic activity could be displaced by OWMC facilities;
- The economic impacts which could be expected in the vicinity of each siting option; and
- The economic impacts the facilities could have on the community and regional economy.

These considerations were expected to vary to some degree from one siting option to another and thus could be used to compare and contrast the siting options.

The five economic base impact factors and their associated indicators and sub-indicators are presented in Table 2. Each factor pertains to the impacts of the facilities in a relevant study area: the site, site vicinity or community and regional (see section 2.3.2 for a definition of these terms). The rationale for the selection of these factors is summarized on the next few pages. More complete descriptions of the factors, their rationale and significance, along with data sources, are presented in Appendix A.

2.2.2 DISPLACEMENT OF BUSINESS ACTIVITY

This factor relates to the business operations that would be displaced under each siting option. It is important in the economic base impact analysis because it describes a change in economic activity and indicates the degree of disruption that may be caused at each siting option.

TABLE 2

IDENTIFIED FACTORS, INDICATORS AND SUB-INDICATORS BY STUDY AREA, ECONOMIC BASE IMPACT ANALYSIS

Study Area	Factors	Indicators	Sub-Indicators
Site	Displacement of Business Activity	Number of businesses	
		Number of employees	
		Annual sales	
Site Vicinity	Property Value Impacts		
	Business Activity Positively Affected by the Presence of OWMC Facilities	Number of businesses	
		Number of employees	
		Annual sales	
	Business Activity Negatively Affected by the Presence of OWMC Facilities	Number of businesses	
		Number of employees	
		Annual sales	
Community and Regional	Community and Regional Economic Base	Number of new jobs created	
		Number of additional households created	- area municipality - regional municipality
		Perceptions of community economic impact	- number of businesses perceiving positive impacts - number of businesses perceiving negative impacts

Three indicators are identified for this factor: the number of businesses displaced; the number of employees displaced; and the annual sales of businesses displaced.* The number of businesses displaced provides an indication of the breadth of disruption - generally, the degree of displacement would likely be greater if a specified level of economic activity was being undertaken by several smaller firms rather than a single large firm. Employment and sales levels are both used as indicators of the actual amount of economic activity being displaced.

2.2.3 PROPERTY VALUE IMPACTS

Residents in the site vicinity of the six siting options have voiced concerns at public meetings regarding the presence of OWMC facilities and their potential impact on property values. The ownership of property is an important component of many people's net worth, and any negative impact on property values could affect the economic stability of the local community.**

The evaluation of property value changes in the vicinity of each siting option is the data source for this factor. There are no identified indicators or sub-indicators.

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* Business activities included in the analysis of this factor include agri-businesses, home-businesses, commercial/industrial firms, a tourist business (trailer camp) and recreational type uses. For definitions of these businesses, see Appendix B, pages B-3 to B-5.

** These impacts can, of course, be mitigated. The institution of a property value protection program by OWMC covering affected properties is one possibility. See Chapter 6 for a discussion of the effects of this type of program.

2.2.4 BUSINESS ACTIVITY POSITIVELY AFFECTED BY THE PRESENCE OF OWMC FACILITIES

This factor relates to business operations in the site vicinity of the siting options which could be positively affected by the presence of OWMC facilities.* These are businesses that might experience increased revenues, e.g., a restaurant or gas station, or firms that might experience lower waste disposal costs due to their proximity to the facilities. The factor does not measure the extent to which these businesses may be affected, only that some positive effect may occur.

The characteristics of businesses which could be positively affected by the presence of OWMC facilities are described using three indicators:

- Number of businesses;
- Number of employees; and
- Annual sales.

Information for this factor is provided from the analysis of the impacts of OWMC facilities on business operations in site vicinity areas.

2.2.5 BUSINESS ACTIVITY NEGATIVELY AFFECTED BY THE PRESENCE OF OWMC FACILITIES

This factor describes the characteristics of business operations whose viability may be negatively affected by the presence of OWMC facilities. These businesses are located within the site vicinity of the various siting options. The factor does not measure the extent to which these businesses may be affected, only that some negative effect may occur.

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* Business activities included in the analysis of this factor (and the next factor) include agri-businesses, home-businesses, commercial/industrial firms, a tourist business (trailer camp) and recreational type uses.

The indicators and relevant components of the impact analysis utilized here are the same as for the analysis of positively affected business operations.

2.2.6 COMMUNITY AND REGIONAL ECONOMIC BASE

This factor essentially relates to the overall impact of OWMC facilities on the community and regional economy.* Community and regional economic base impacts differ from many other impacts considered by the site selection team in that the impacts are for the most part positive. The indicators used to quantify this factor are the following:

- Number of new jobs created;
- Number of additional households created; and
- Perceptions of community economic impact.

Employment generated by OWMC facilities is considered only at the regional level. This boundary was selected since OWMC facilities will affect a broad labour market, with many employees commuting from outside the candidate area municipality and many of the induced employment effects occurring outside as well.

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* Community corresponds to the boundaries of the appropriate area municipalities while regional refers to the regional municipalities.

The impact of OWMC facilities on the economy of the candidate area municipalities is taken into account by the second and third indicators for this factor. The estimated increase in households is considered at both the area and regional municipality level since the relocation of existing households and the creation of new households brings ancillary benefits to both levels of municipalities. The perceptions of business operators on-site and in the site vicinity as to the potential economic impact of the facilities was selected as an area municipal indicator, since those being interviewed related more strongly with the local economy than the regional economy.

The data for this factor are yielded from the community and regional economic base impact analysis.

2.3 METHODOLOGY AND ASSUMPTIONS

The purpose of this section is to outline the methodology and key assumptions used in the economic base impact analysis. The following considerations are discussed in this section: (1) the methodology of the economic base impact analysis; (2) study areas; (3) the base year utilized in the analysis; (4) facilities characteristics assumptions; (5) the employment multiplier; (6) estimates of household growth; (7) property value impacts; and (8) displacement of business activity.

2.3.1 THE METHODOLOGY OF THE ECONOMIC BASE IMPACT ANALYSIS

The economic base impact analysis undertaken for Phase 4A of the site selection process incorporates many of the key economic variables normally associated with economic base studies. These variables include employment by industrial category, linkages between existing primary and manufacturing industries, service industries and population (which are all used to estimate employment multipliers) and the commuting patterns of local employees and residents (which are used in the estimation of household growth and employment multipliers). The analysis first examines the economic base of the candidate municipalities in terms of these variables. This is followed by the estimation of the changes in the economic base which would result from the presence of OWMC facilities.

In economic base analysis, the possibility of facilities such as those proposed by OWMC generating spin-off industries is normally examined. A spin-off industry is defined as an industry which would locate in proximity to a defined base industry and which: (1) provides products and services to the base industry; or (2) purchases products and services from the base industry. The former, which are commonly referred to as backward linkages, are part of the economic base impact analysis undertaken in this report. Possible forward linkages, where spin-off firms purchase products and services from the base industry, were examined by another member of the site selection team and it was concluded that there would be no forward linkages associated with OWMC facilities.* The question of potential industrial spin-offs which are forward linkages are addressed in this analysis through qualitative, rather than quantitative, considerations.

An employment multiplier, as opposed to an income multiplier, has been used in the economic base impact analysis primarily due to data availability and ease of calculation. Data on income flows (which are necessary to estimate income multipliers) are not available for small geographical areas such as the areas being examined in this report. While this could be overcome through detailed surveys, and through the use of several indirect sources of income information, this approach is costly, time consuming and is not considered to improve the comparative evaluation of economic base impacts between siting options. The employment multiplier utilized in this analysis is considered to provide a reasonable estimate of the employment impacts of OWMC facilities on the candidate regional municipalities and is suitable for the comparative evaluation of siting options.

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* Appendix F includes a discussion of possible spin-off industries. The evaluation of spin-off industries associated with OWMC facilities was undertaken by Dr. Howard Stafford. See "Hazardous Waste Management Facility Siting and the Location of Related Economic Activities", which is included in this report as an addendum to Appendix F.

The generalized schema of the economic base impact analysis was shown in Table 2 on page 18. The community and regional economic base factor estimates the impact of OWMC facilities on both area and regional municipality economic activity. Its estimation includes the development of employment multipliers and a household growth forecast. Business perceptions as to whether OWMC facilities would have a positive or negative impact on community economic conditions represents a partial substitute for detailed information on local industrial linkages.

The other measures of the economic base impacts of OWMC facilities are site specific (displacement of business activity) or relate to the site vicinity (impact on property values and positive and negative impacts on business activity). While these impacts would typically be translated into an overall calculation of employment and household changes in a standard economic base analysis, they are identified separately in this report because the relative impact of OWMC facilities on the site and site vicinity is the important consideration in Phase 4A of the site selection process.

2.3.2 STUDY AREAS

The study areas utilized in the economic base impact analysis are as follows: site area; site vicinity; and community and regional grouped together.

Site area

The site area is defined to include the land area encompassed by the maximum potential acquisition boundary for each siting option.

The economic base impact analysis is concerned with the number and characteristics of business operations which would be displaced on-site under each siting option.

Site vicinity

The site vicinity is usually defined in this report to encompass an approximately two kilometre impact zone around each siting option. The radius of this zone is measured from the geographic centre of each candidate site with some adjustment on the outer edges being made to account for property boundaries. This definition for the site vicinity was used as the boundary for the business survey conducted by Clayton Research Associates to obtain data on business activities in the site vicinity of each siting option.

The definition of site vicinity for property value impacts is slightly different, however. A 1,500 metre zone beyond the maximum potential acquisition boundary of the siting option was delineated for this analysis. As it is assumed the impacts of OWMC facilities on property values decrease with distance, the site vicinity is subdivided into three zones of 500 metres each for impact estimation purposes.*

The boundary definitions of site vicinity used in this analysis were considered adequate for estimating impacts for the comparative evaluation of siting options.

Community and regional

The community and regional study areas are defined in this report as the candidate area and regional municipalities within which any siting option is located. As such, there are three community study areas (West Lincoln, Niagara Falls and Milton) and two regional study areas (Niagara and Halton) under consideration in the economic base impact analysis.

The community and regional study areas were used to determine the broader economic impacts of OWMC facilities through the estimation of job creation and household growth associated with the facilities and the determination of business operator perceptions (from businesses on-site and in the site vicinity of candidate siting options) of potential community economic impact.

2.3.3 BASE YEAR

The approach to the analysis undertaken in this report is to superimpose operational OWMC facilities under various siting options on the economic structures of the area and regional municipalities as they existed in the latest year for which information is available (for most variables, the latest year is 1984).

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* A detailed definition of the three zones used in the property value impact analysis, along with the rationale for selecting these zones, is provided in Appendix C.

Data utilized in this economic base impact analysis were obtained from a variety of sources. Business survey data collected by Clayton Research Associates were collected in 1984. Data on municipal industrial structures and commuting patterns of residents were obtained from the 1981 Census of Canada and are assumed to apply to the 1984 base year. Data on the assessed and market values of properties in the site vicinity were collected for 1984.

An alternative to the above approach would have been to project the economic environment at the time OWMC facilities are expected to begin operation and to superimpose the facilities at that time. This approach would require a strong reliance on forecast data, while the adopted approach does not. While this approach could be applied in Phase 4B of the site selection process (when more detailed and site specific analysis is to be undertaken for a single preferred siting option), it was not utilized in the general analysis due to the degree of uncertainty arising from the large number of underlying assumptions required. Notwithstanding this, future economic assessment scenarios are considered separately in this report in Chapter 3 in the qualitative discussion of anticipated future trends in economic development and in Chapter 6 in a sensitivity test of the ranking of siting options to anticipated future growth patterns. The adopted approach was considered adequate for the comparative evaluation of siting options.

The approach used here is based on an actual situation (actual economic base data) rather than projections. The major limitation of this approach is that, as most municipalities grow over time, economic impacts would be overstated (since relative economic impacts tend to be greater, the smaller the size of the municipality). This should not create a problem for this analysis, since any limitations associated with this approach apply equally to all siting options and therefore should not influence the ranking of the siting options.*

2.3.4 FACILITIES CHARACTERISTICS ASSUMPTIONS

Capacity of 300,000 tonnes per year

The site selection team is basing their impact and ranking assessment on the assumption that OWMC facilities will have an ultimate capacity to process 300,000 tonnes of special wastes per year. This capacity is twice the proposed initial capacity and represents the possible size of the facilities in their fifth year of operation, with 300,000 tonnes of special wastes being processed in year ten.

The 300,000 tonnes per year capacity was utilized to represent an upper limit for the analysis of impacts on the transportation system, air emissions and water quality. The economic base impact analysis (as well as the municipal finance impact analysis) differs in a significant way from most other factors being considered by the site selection team. Largely due to the favourable economic consequences flowing from increased employment, the construction of OWMC facilities will have a number of positive impacts on the regional economy (there will, of course, be some negative economic impacts as well). Consequently, the use of the 300,000 tonnes capacity exaggerates the level of these positive impacts for the early years of operation when the capacity will be 150,000 tonnes per year. However, the use of the larger capacity figure does not affect the relative ranking of siting options according to the economic base impacts of the facilities.*

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* This is especially true for the three area municipalities where minimal or slow growth is anticipated over the next decade. Milton will require a major expansion of services before significant household growth can take place. Evidence also suggests that the slow pace of growth experienced by both Niagara Falls and West Lincoln will continue.

On-site operations employment of 217-221 persons

It is estimated by Monenco Limited that a total of 217 persons will be employed at the facilities having a 300,000 tonnes capacity under each of the three partially integrated siting options (e.g., treatment facilities and landfill site separated). Under each of the three fully integrated siting options, direct employment at the facilities is anticipated to total 221 persons. Including benefits, the annual cost of this labour to OWMC is calculated by Monenco Limited to be approximately $8.0 million (1984 dollars).

Concentration on operations phase

Both the community and regional economies will receive some positive impacts from OWMC facilities during the construction phase as well as the operations phase. Monenco Limited has estimated the average monthly employment at 360 persons during the 18 month construction phase. The peak construction period is expected between months 10 and 16 when there could be up to 600 workers on-site.**

The economic base impact analysis does not consider impacts during the construction phase. These impacts will be relatively short-lived (18 months) and, with the high mobilty of construction labour (from the Toronto and Hamilton areas), it is difficult to predict within any degree of reliability the number of construction workers that will live within the candidate municipalities. The more detailed analysis to be conducted in Phase 4B of the site selection process, when a preferred siting option has been selected, could consider economic base impacts during the construction phase.

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* The sensitivity of the analysis to facilities with a 150,000 tonnes capacity is examined in Chapter 6.

** See Monenco Limited, Facility Design, 1985.

Total spending on supplies and services estimated at $36 million

The largest component of the annual operating cost of OWMC facilities, accounting for 39 percent of the total (or $14 million in 1984 dollars), is expected to be the purchase of additives and reagents required to undertake the treatment of special wastes. For site selection purposes, the suppliers of these chemicals are assumed not to vary by siting option. With the exception of miscellaneous consumables (e.g., lubricants and filters), which constitute only one percent of the chemical purchases, almost three-quarters of these chemicals are expected to be purchased from firms located in the Toronto area under all siting options.*

The second largest component of the operating cost of OWMC facilities is expected to be the cost of maintenance parts for the facilities and administrative expenses. These costs are anticipated by Monenco Limited to total $10 million (28 percent of the total). Spare parts will be purchased from suppliers which may or may not be located in the candidate municipalities.

The contracting of independent haulers is anticipated to account for a further $6 million (17 percent of the operating costs). These haulers will: (1) transport the special wastes from the waste generators to OWMC facilities; (2) transport the additives and reagents to be used in the treatment of the special wastes; and (3) transport the inert residues from the incinerator and physical/ chemical treatment and solidification plant to the landfill.

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* See Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

These expenditures by OWMC on operating costs would impact the economies of the candidate municipalities to the extent that purchases would be made from local suppliers and haulers. In this economic base analysis, the impact of these (regional) expenditures on the regional economy are assumed to be the same as the expenditures of existing industries in these municipalities. This impact is accounted for in the employment multiplier estimated for each regional municipality.

2.3.5 EMPLOYMENT MULTIPLIER

Employment multipliers are calculated in the economic base impact analysis for both the Region of Niagara and the Region of Halton. The employment multiplier is calculated first for the base regional economy and then is adjusted to take into account the available local labour supply and the impact of residents working outside the region. These adjustments, which are reflected in the employment multipliers presented on the next page, are discussed in greater detail in Chapter 3 and Appendix D of this report.

Locating OWMC facilities in a candidate regional municipality will increase employment from three sources:

- Direct employment - workers involved in the actual operation of OWMC facilities;
- Indirect employment - jobs created in activities in the regional economy which are linked to the provision of inputs to OWMC facilities; and

- Induced employment - jobs created in the regional economy as a result of the spending of incomes generated by the direct and indirect employment (e.g., a plant employee's family grocery purchases would support employment in a grocery store).

Direct employment will be the same for all siting options (217-221 persons). Indirect employment will vary slightly by siting option, depending on whether the siting option is fully integrated or partially integrated. Induced employment will vary between municipalities depending on the linkages between the manufacturing, service and retail sectors, and the locational preferences of households generated, which in turn will influence service and retail employment. The creation of indirect and induced employment is referred to as the employment multiplier.

The estimation of employment multipliers is more reliable when the specific economy under study is larger and more definable. The economic base impact analysis undertaken in this report is conducted at the regional municipality level. Data by industrial sector, which is essential for employment multiplier calculations, are readily available at the regional level. Employment impacts on an area municipality are difficult to determine in an integrated region consisting of several area municipalities which have strong trading links with each other.

The estimation of employment multipliers involves a detailed data analysis of the economic base (as discussed in Appendix D). The estimate of the employment multipliers resulting from OWMC facilities in the candidate regional municipalities are as follows:

	Employment Multiplier
Region of Niagara	1.71
Region of Halton	1.67

The employment multiplier represents a multiple of the jobs created directly by OWMC facilities. For every direct job created by OWMC in the Region of Niagara, there would be the equivalent of an additional .71 job created by the indirect and induced employment. In the Region of Halton, the employment multiplier is slightly lower with an additional .67 job being created by indirect and induced employment.*

2.3.6 HOUSEHOLD GROWTH IMPACTS

The employment generated by OWMC facilities will result in an increased demand for housing in the candidate area and regional municipalities.

Since each area municipality is part of a regional economy and housing market, an analysis of household growth by location must consider the overall regional market as well as the potential for the area municipality to attract households.

The estimation of the increase in households in the area and regional municipalities resulting from OWMC facilities consists of three steps:**

- Estimation of the number of households moving (migrating) into the region to work.

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* The Region of Niagara multiplier is slightly higher since it was determined that the spending patterns of households in Niagara support a larger service and retail labour force (non-basic) than households in Halton. The actual difference is tempered somewhat because it is assumed that more of the employment growth in Niagara will be filled by existing residents as opposed to in-migrants. For a detailed discussion of this analysis, see Appendix D.

** See Appendix E, Description of Household Impact Estimates, for a detailed description of the methodology.

Based on the estimates of total employment generated in the region by OWMC facilities, estimates are made regarding the proportion of this employment comprised of people who: (a) already live in the region; (b) move to the region; and (c) commute to work in the region but continue to live elsewhere.

The number of households moving into the region as a result of OWMC facilities is assumed to be equivalent to the number of workers moving into the region.

- Estimation of the number of households created by persons already living in the region.

There should be some positive effect of OWMC facilities on household formation from people currently residing in the region. This is especially true for previously unemployed young people who were either living with parents or others and who now (with their new income) are able to support a separate household. This effect is incorporated in the household growth calculations for the regional municipality.

- Estimation of the proportion of additional regional households that will locate in the area municipality where the facilities are located.

A proportion of the additional households generated in the region is allocated to the area municipality in which OWMC facilities are situated based on a consideration of the proportion of persons working in the area municipality in 1981 who also lived in the municipality.

2.3.7 PROPERTY VALUE IMPACTS

Like most major industrial enterprises, there will be a certain amount of noise, odour and dust associated with OWMC facilities.* The buffer zone surrounding the incinerator and physical/chemical treatment and solidification plant, which will be a component of each site, will limit the worst of these effects to the actual property owned by OWMC.

By utilizing the best available proven commercial technologies, it is assumed there will not be serious detrimental health effects to workers or off-site residents caused by OWMC facilities.** There is likely to be an initial perception, however, that the facilities will create negative connotations for residents and business activity in the vicinity of the site. While this perception will likely diminish over time as the facilities become an accepted part of the local economy, it will likely be reflected in some initial negative impact on property values.

The estimation of the impact of large facilities (such as OWMC facilities) on the value of surrounding properties is difficult. The estimation depends on numerous variables including the perceptions and reactions of both existing and prospective property owners not only at the present time but also many years after the facilities are in operation.

A review of the literature on the property value impacts of the construction of large-scale facilities, which could be termed potentially objectionable, provides some useful input into this analysis.* However, even the most comprehensive of these property value impact studies suffer from two major shortcomings: (1) comparatively few property transactions on a yearly basis upon which to make impact judgements; and (2) the lack of laboratory conditions where the impact of a single condition (i.e., the construction of objectionable facilities) can readily be separated from all other conditions and events affecting property values.

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* See Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

** This is discussed in Environ Corporation, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Generic Risk Assessment, 1985.

The approach utilized in this report to determine negative property value impacts is based on a review of impact studies of projects which appeared to be related to the proposed OWMC facilities. It was not possible to obtain case studies which exactly duplicated this situation. The literature is heavily weighted towards the negative property value impacts associated with major road facilities. In recent years however, there has been a growing literature dealing with sanitary landfill sites, nuclear plants, power transmission corridors and similar types of projects.

The literature indicates that the property value impacts associated with major facilities such as OWMC facilities differ by type of property. Industrial properties are affected least, if at all. Major facilities are shown to have the largest negative impact on residential property values.

The major assumptions used to determine the property value impacts of OWMC facilities are shown on Table 3. The Table shows the assumed decline in property values, by type of property and distance from OWMC facilities. Based on the literature review, it is assumed that there will be a larger negative impact on residential property values than on farm or commercial and industrial properties. Table 3 also shows the declining property value impact of the facilities with increasing distance from the site. A sensitivity analysis is undertaken in Chapter 6 and presents the results of the economic base impact analysis if property values were to decline by an even greater degree.

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* Appendix C, Description of Property Value Impact Estimates, provides a bibliography and detail of the relevant literature as well as details of the methodology applied here.

TABLE 3

ASSUMED PROPERTY VALUE IMPACTS
BY TYPE OF PROPERTY AND IMPACT ZONE, PERCENT

	Type of Property		
Impact Zone	Residential	Farm/ Vacant	Commercial and Industrial*
0-500 metres	-16.00	-15.00	-10.00
501-1,000 metres	-8.00	-7.50	-5.00
1,001-1,500 metres	-4.00	-3.75	-2.50
1,500+ metres	0.00	0.00	0.00

* Only businesses negatively affected are included in the estimation of property value impacts.

Source: Appendix C.

2.3.8 DISPLACEMENT OF BUSINESS ACTIVITY

All business activities, along with other existing land uses, will be displaced from the selected siting option by OWMC facilities. In the economic base impact analysis, only the displacement of business activities are examined. Business activities are defined in this report to include agri-businesses, home-businesses, commercial/industrial firms, a tourist operator (trailer camp) and recreational type uses.* Displacement of farm activities and residential uses were considered by other members of the site selection team.**

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* For detailed definitions of these business types, see Appendix B, pages B-3 to B-5.

** For a discussion of farm displacement, see Ecologistic Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985. For a discussion of resident displacement, see Institute of Environmental Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Social Analysis, 1985.

2.4 DATA COLLECTION AND ANALYSIS

The purpose of this section is to present the data used in the estimation of the five impact factors which have been identified for the economic base impact analysis. This section includes a data summary by siting option and a discussion of limitations of the data.*

2.4.1 DISPLACEMENT OF BUSINESS ACTIVITY

TABLE 4

CHARACTERISTICS OF PROPERTIES ON THE SITING OPTIONS, 1984

Siting Option	Area Municipality	Number of Properties by Type Farm/ Vacant	Non-Farm	Total	Total Area Hectares	Percent of Area Assessed as Farm/Vacant
LF-3C	West Lincoln	7	0	7	206	100
LF-9C	West Lincoln	4	0	4	135	100
LF-1E	Niagara Falls	10	1	11	273	98
LF-1E/PI-27E	Niagara Falls	18	4	22	323	96
LF-4N/PI-1N	Milton	15	5	20	343	99
LF-4N/PI-13N	Milton	10	3	13	338	100

Source: Municipal Assessment Rolls and Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

The indicators for the displacement of business activity factor (which were defined earlier in this chapter) include number of business operations, number of employees and total annual sales. The impact of OWMC facilities on business activity on-site not only depends on the mix and density of land uses on-site, it also depends on the size of the siting option.

The siting options range in size from 135 hectares for integrated option LF-9C in West Lincoln to 343 hectares for partially integrated option LF-4N/PI-1N, which is comprised of two sites in

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* In Chapter 3 of this report, the economic base characteristics of the five candidate municipalities are highlighted. The emphasis in that chapter is on the extent to which the estimation of the economic base factors identified in this chapter could be affected by the economic environment of these municipalities.

Milton.* Farms and vacant land are the most prevalent types of property on the siting options, but the numbers are comparatively small (ranging from four properties on LF-9C in West Lincoln to 18 properties on LF-1E/PI-27E in Niagara Falls). For all siting options, virtually the entire area is assessed as farm land (96 percent or more).

The number of business operations on the candidate siting options varies from nil for the two West Lincoln siting options (LF-3C and LF-9C) to seven on LF-1E/PI-27E in Niagara Falls. The number of employees that would be displaced ranges up to 33 for siting option LF-1E/PI-27E. Total annual sales of these operations exceed $500,000 only in three siting options - LF-4N/PI-1N in Milton and the two Niagara Falls siting options (LF-1E and LF-1E/PI-27E).

TABLE 5

CHARACTERISTICS OF BUSINESSES DISPLACED BY SITING OPTION, 1984

Siting Option	Area Municipality	Number of Operations	Employment (Persons)	Total Annual Sales ($000)
LF-3C	West Lincoln	0	0	0
LF-9C	West Lincoln	0	0	0
LF-1E	Niagara Falls	6	22	1,741
LF-1E/PI-27E	Niagara Falls	7	33	2,616
LF-4N/PI-1N	Milton	5	14	709
LF-4N/PI-13N	Milton	3	8	269

Source: Appendix Tables B-5, B-6 and B-7.

The three business operations on LF-4N/PI-13N in Milton consist of two agri-businesses dealing with the breeding, boarding and training of horses and one agri-business involved with both horses and livestock. The five business operations on LF-4N/PI-1N in Milton are comprised of the two horse agri-businesses, two custom operators (classified as agri-businesses) and an aircraft repair business. The six businesses on LF-1E in Niagara Falls consist of an agri-business leasing horse stables, two home-businesses involved in knitting and in raising crawfish for fishing tackle, two agri-businesses involved with training racehorses and an auto wrecking yard. The seven businesses on siting option LF-1E/PI-27E include five of these six operations (the knitting home-business on LF-1E is excluded due to the different boundaries for the partially integrated option) plus a warehouse storage business and a home-business involved with the repair of farm equipment.*

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* Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

The data for business activity displacement were obtained through a business survey conducted by Clayton Research Associates (the details of the survey are provided in Appendix B). The response rate to the survey exceeded 90 percent in both West Lincoln and Milton. The response rate in Niagara Falls although lower, also was quite high and exceeded 80 percent. Estimates for non-responses were made by Clayton Research Associates. The data presented for business activity displacement is regarded as quite accurate and provides a good measure of on-site economic impacts.

2.4.2 PROPERTY VALUE IMPACTS

Property value impacts are measured by the potential negative impacts of OWMC facilities on property values in the site vicinity of each siting option (a radius of up to 1,500 metres beyond the maximum potential acquisition boundary). The assumptions regarding the percentage decrease in property values by property type and distance from the facilities site were presented on Table 3 (page 37).

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* Under this partially integrated option, LF-1E in the City of Niagara Falls would be used for the engineered landfill and PI-27E would accommodate the physical/chemical treatment and solidification plant. As a consequence, the site boudaries for LF-1E under the partially integrated option are reduced, thereby excluding one business.

TABLE 6

ESTIMATED NEGATIVE PROPERTY VALUE IMPACTS IN THE SITE VICINITY OF THE SITING OPTIONS, 1984*

		Estimated Negative Impact	
Siting Option	Area Municipality	Dollars (000s)	Percent Decline**
LF-3C	West Lincoln	451	7
LF-9C	West Lincoln	435	7
LF-1E	Niagara Falls	679	8
LF-1E/PI-27E	Niagara Falls	1,050	4
LF-4N/PI-1N	Milton	1,487	8
LF-4N/PI-13N	Milton	1,912	8

* The site vicinity is defined as a 1,500 metre zone surrounding each siting option.

** Estimated negative impact as a proportion of the market value of all properties in the site vicinity which will be negatively affected.

Source: Appendix Table C-7.

The estimates of property value impacts show an average property value decline in the medium- and short-term (zero to five years) in the site vicinity of the siting options ranging from four percent for siting option LF-1E/PI-27E in Niagara Falls to seven or eight percent for the remaining five siting options. The smaller decline in average property values for LF-1E/PI-27E is due largely to the fact that the property values of two large firms in its site vicinity are assumed not be negatively affected by the facilities. If these properties are excluded from the aggregate market value of properties in the site vicinity, the average decline would be comparable to the other siting options.

In dollar terms, the base case estimate of negative property value impacts in the site vicinity of the siting options varies from a low of $435,000 near LF-9C in West Lincoln to over $1.9 million around LF-4N/PI-13N in Milton.

The estimation of the negative property value impacts of OWMC facilities was limited by the availability of data on property values surrounding similar type facilities. Furthermore, the literature review shows that negative property value impacts could very well decrease over time as OWMC facilities become an accepted part of the local economy.

2.4.3 BUSINESS ACTIVITY POSITIVELY AFFECTED

Data on the perceptions of business operators regarding the potential positive and negative impacts of OWMC facilities on their operations were obtained through the business survey conducted by Clayton Research Associates (with some verification and adjustments made to ensure consistency of response). The results of that survey are presented in Appendix B.

TABLE 7

BUSINESSES IN SITE VICINITY WHOSE OPERATIONS COULD BE POSITIVELY AFFECTED BY OWMC FACILITIES, 1984

Siting Option	Area Municipality	Number	Employment (Persons)	Total Annual Sales ($000)
LF-3C	West Lincoln	0	0	0
LF-9C	West Lincoln	1	3	68
LF-1E	Niagara Falls	1	2	100
LF-1E/PI-27E	Niagara Falls	12	1,450	81,928
LF-4N/PI-1N	Milton	1	125	7,500
LF-4N/PI-13N	Milton	2	129	7,568

Source: Appendix Tables B-5, B-6 and B-7.

With the exception of business operations in the vicinity of LF-1E/PI-27E in Niagara Falls, only a small number of site vicinity businesses have the potential to benefit financially from proximity to OWMC facilities. There are no potentially benefiting operations in the site vicinity of LF-3C in West Lincoln. The one potentially benefiting business near siting option LF-9C in West Lincoln is a variety store, the one business near LF-1E in Niagara Falls is involved with the repair and leasing of automobiles (both of these businesses could benefit from increased traffic and the presence of on-site workers) and the one business near LF-4N/PI-1N in Milton is a plastics manufacturer which might benefit from lower waste disposal costs with OWMC facilities nearby. For siting option LF-4N/PI-13N in Milton, the only businesses which may be positively affected are the plastics manufacturer and a service station/restaurant which could benefit from increased truck traffic.

The siting option where business operations in the site vicinity have the greatest likelihood of being positively affected by OWMC facilities is LF-1E/PI-27E in Niagara Falls. There are 12 businesses in the site vicinity of this siting option which could benefit from increased truck traffic or proximity to waste disposal facilities. These include trucking companies, chemical manufacturers, rubber manufacturers, an excavation/construction firm, a motel/restaurant, a glass fabrication plant, an industrial tools, pipes and fittings manufacturer and a plastics manufacturer.

Data provided by respondents in the business survey were checked for consistency between similar respondents. Since the question regarding the (positive or negative) impact of OWMC facilities on existing businesses hinges on an accurate perception of the facilities, which can best be gained once the facilities are in operation, it is difficult to determine the accuracy of the response to this question.

2.4.4 BUSINESS ACTIVITY NEGATIVELY AFFECTED

TABLE 8

BUSINESSES IN SITE VICINITY WHOSE OPERATIONS COULD BE NEGATIVELY AFFECTED BY OWMC FACILITIES, 1984

Siting Option	Area Municipality	Number	Employment (Persons)	Total Annual Sales ($000)
LF-3C	West Lincoln	9	69	2,348
LF-9C	West Lincoln	4	9	355
LF-1E	Niagara Falls	6	18	1,333
LF-1E/PI-27E	Niagara Falls	12	69	2,192
LF-4N/PI-1N	Milton	14	39	1,473
LF-4N/PI-13N	Milton	16	91	4,318

Source: Appendix Tables B-5, B-6 and B-7.

The number of business operators who perceived their activities would be negatively affected by the presence of OWMC facilities varied from a low of four in the site vicinity of siting option LF-9C in West Lincoln to 16 in the site vicinity of LF-4N/PI-13N in Milton. It should be noted that the analysis does not indicate the severity of the potential negative impacts, only that these impacts may occur. The number of employees in these operations ranges from nine in the site vicinity of LF-9C in West Lincoln to 91 in the site vicinity of LF-4N/PI-13N in Milton. Total annual sales of these operations range from $0.4 million for businesses in the site vicinity of LF-9C to $4.3 million for businesses in the site vicinity of LF-4N/PI-13N.

The majority of business operations that may be negatively affected by OWMC facilities are those that depend on a rural environment. There were concerns expressed at public meetings and through the business survey about the possible effects of OWMC facilities on the raising of thoroughbred racehorses and the growing of nursery orchards in Milton. Of particular note near siting option LF-3C in West Lincoln is the Robert Land Military Academy, a private boarding school for boys (and a camp for handicapped children in the summer). There is the possibility that some parents may withdraw their children if OWMC facilities were built in the vicinity. There are horse related businesses, a meat packing operation and some recreational and tourist establishments (e.g., golf and country clubs and a trailer camping ground) near LF-1E and LF-1E/PI-27E in Niagara Falls whose operations could suffer because of proximity to OWMC facilities.

The data limitations for estimating business activity negatively affected by OWMC facilities are the same as those discussed for business activity positively affected.

2.4.5 COMMUNITY AND REGIONAL ECONOMIC BASE

The estimation of the impact of OWMC facilities on the community and regional economic base includes an estimate of the impact on employment and household growth as well as on-site and site vicinity business operator perceptions of the potential positive and negative impacts of OWMC facilities at the community level.

Impact on employment

The total number of jobs created by OWMC facilities varies by siting option. The largest estimated regional employment impacts are estimated to be created by LF-1E/PI-27E and LF-1E in Niagara Falls (422 and 395 jobs, respectively). The smallest regional employment impacts are estimated for the two Milton siting options and LF-3C in West Lincoln (331 and 316 jobs, respectively). These differences occur largely due to differences in the number of jobs assumed to be filled by commuters under the various siting options.

TABLE 9

ESTIMATED NUMBER OF NEW JOBS CREATED BY OWMC FACILITIES AND FILLED BY RESIDENTS OF THE CANDIDATE REGIONS

Regions	Basic Employment*	Non-Basic Employment**	Total
Niagara			
LF-3C	185	131	316
LF-9C	208	148	356
LF-1E	231	164	395
LF-1E/PI-27E	247	175	422
Halton			
LF-4N/PI-1N	198	133	331
LF-4N/PI-13N	198	133	331

* Basic refers to both direct and indirect employment. Direct refers to the number of jobs on-site. Indirect refers to the number of jobs generated by the purchase of supplies and services in the region by OWMC.

** Non-basic (induced) refers to the number of jobs in the region created through the spending of basic workers.

Source: Appendix Table D-9.

The calculation of the employment impact estimates of OWMC facilities are detailed and are outlined in Appendix D.

Impact on households

The number of households generated by OWMC facilities in both the area and regional municipalities differ by siting option. At the area municipality level, the estimate of households generated ranges from 60-67 households in West Lincoln to 116-125 households for the two Niagara Falls siting options. In Milton, the additional households generated by OWMC facilities is estimated to total 77 under both siting options.

TABLE 10

ESTIMATED NUMBER OF ADDITIONAL HOUSEHOLDS GENERATED BY OWMC FACILITIES IN THE CANDIDATE AREA AND REGIONAL MUNICIPALITIES

	Siting Options					
Municipality	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Area	67	60	116	125	77	77
Region	133	150	165	178	172	172

Source: Appendix Tables E-1 and E-2.

At the regional level, the estimate of households generated by OWMC facilities ranges from a low of 133-150 for the two West Lincoln siting options to a high of 178 for LF-1E/PI-27E in Niagara

Falls. The number of estimated regional households resulting from either Milton siting option is 172.

Total estimated household growth is highly dependent upon expected employment gains. The distribution of household growth by area municipality was determined by journey to work data from the 1981 Census of Canada. The detailed calculations of household growth are contained in Appendix E.

Perceived community economic impact

Most of the business operators on-site and in the vicinity of the candidate siting options believe OWMC facilities would have a negative impact on the economy of their community.* More than half the business operators in the site vicinity of all six siting options believed that OWMC facilities would not bring economic benefits to their community. Only the business operators in Niagara Falls appeared to be more positive about the prospects for economic benefits being generated in their community by OWMC facilities.

TABLE 11

PERCEIVED POSITIVE AND NEGATIVE
COMMUNITY ECONOMIC IMPACTS OF OWMC FACILITIES
BUSINESSES IN VICINITY OF CANDIDATE SITES, 1984

Siting Option	Area Municipality	Number of Businesses Perceiving*: Positive Impacts	Number of Businesses Perceiving*: Negative Impacts
LF-3C**	West Lincoln	5	20
LF-9C**	West Lincoln	5	19
LF-1E	Niagara Falls	7	9
LF-1E/PI-27E	Niagara Falls	19	21
LF-4N/PI-1N	Milton	6	20
LF-4N/PI-13N	Milton	7	21

* Some businesses could envisage both positive and negative economic impacts.

** Includes responses received from the adjacent rural services centres of Wellandport and Bismarck.

Source: Appendix Table B-8.

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* In addition to surveying business operators on-site and in the site vicinity of siting options LF-3C and LF-9C in West Lincoln, business operators in Wellandport and Bismarck were also surveyed for their perceptions of community economic impact due to the possible impact of OWMC facilities on these adjacent rural service centres.

Business operators in the communities of Wellandport and Bismarck in West Lincoln, which are outside the two kilometre site vicinity of siting options LF-3C and LF-9C, were also surveyed. The majority of these businesses also foresaw negative economic impacts at the community level.

The limitations of the data regarding business perceptions of the (positive or negative) impact of OWMC facilities on the community economy are subject to the same limitations as were discussed in section 2.4.3.

2.5 SUMMARY

In this chapter, the methodology of the economic base impact analysis, along with the major assumptions utilized, were presented. The estimates of the employment multiplier calculated for both candidate regional municipalities were also presented. In the following chapter, the characteristics of the economic base environment of the candidate municipalities are presented and their influence on the size of the employment multiplier is documented.

The OWMC facilities characteristics assumptions, presented in section 2.3.4, are referred to as the base case scenario in this economic base impact analysis. In Chapter 6, changes in the economic base impacts of OWMC facilities are presented for facilities with alternative characteristics.

The data summary presented in section 2.4 is used in the basic acceptability analysis of Chapter 4 and in the comparative evaluation of siting options for economic base impacts presented in Chapter 5.

CHAPTER 3
THE ECONOMIC BASE ENVIRONMENT

3.1 PURPOSE

This chapter highlights the economic base characteristics of the candidate municipalities for the location of OWMC facilities. The emphasis in this chapter is on the extent to which the estimation of the economic base factors identified in Chapter 2 could be affected by the economic environment of these municipalities. The information presented here includes an overview of municipal industrial structure and employment, the commuting patterns of residents, recent trends in industrial growth (including a summary of constraints to economic growth) and a summary of the economic characteristics of the site and site vicinity of each siting option.

Detailed data are presented at the regional level on industrial structure, employment and unemployment. Summary data are presented on employment at the area municipal level. Data on commuting patterns, which are input into the employment and household forecasts, are presented for the area and regional municipalities.

Economic base characteristics are presented for:

Region of Niagara - West Lincoln (siting options LF-3C and LF-9C)

- Niagara Falls (siting options LF-1E and LF-1E/PI-27E)

Region of Halton - Milton (siting options LF-4N/PI-1N and LF-4N/PI-13N)

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Economic base characteristics are presented for:

Region of Niagara - West Lincoln (siting options LF-3C and LF-9C)

- Niagara Falls (siting options LF-1E and LF-1E/PI-27E)

Region of Halton - Milton (siting options LF-4N/PI-1N and LF-4N/PI-13N)

The economic characteristics of the site and site vicinity (i.e., on-site displacement of business activity, property value impacts and perceived impacts of OWMC facilities on businesses in the site vicinity) are presented for each siting option.

3.2 COMMUNITY AND REGIONAL ECONOMIC BASE CHARACTERISTICS - REGION OF NIAGARA

3.2.1 OVERVIEW

The Region of Niagara has a large agricultural and manufacturing base and also derives substantial income from tourism, particularly in Niagara Falls and Niagara-on-the-Lake. The Region is highly dependent on local sources of employment and also on the local service and retail sectors for consumer expenditures.

The Township of West Lincoln, with a 1981 population of 9,846 people, can be characterized as rural, with a high dependency on agriculture. Most of the manufacturing operations in the Township are related to agriculture or forestry.

Siting options LF-3C and LF-9C are located in the rural part of West Lincoln. Both siting options result in the displacement of existing agricultural land uses, but no business type operations. Both siting options are designated for agricultural uses in the Township's Official Plan.

The City of Niagara Falls is both a manufacturing and a tourism centre. Chemicals and chemical products account for a large portion of this manufacturing activity. The population of Niagara Falls totaled 70,960 persons at the time of the 1981 Census of Canada.

TABLE 12

SELECTED ECONOMIC INDICATORS
REGION OF NIAGARA, 1980 AND 1981

Municipality	Area Hectares	Total Employment 1981 Persons	Total Population 1981 Persons	Total Households 1981 Households	Total Household Income 1980 Millions ($)
Niagara Falls	20,447	29,230	70,960	24,880	560
West Lincoln	37,509	2,245	9,846	2,790	70
Rest of Region	121,872	125,985	287,482	99,820	2,358
Total	179,828	157,460	368,288	127,490	2,988

Source: Ministry of Municipal Affairs and Housing, Municipal Directory, 1985 and 1981 Census of Canada.

Siting option LF-1E in Niagara Falls is located outside the developed area of the City. Site PI-27E is located on the edge of an industrial area. The siting options presently contain a mix of rural residential and farm uses; siting option LF-1E also contains one industrial operation. Site PI-27E is designated for industrial uses, while LF-1E is designated for agricultural uses in the City's Official Plan.

3.2.2 INDUSTRIAL STRUCTURE AND EMPLOYMENT

TABLE 13

EMPLOYMENT PROFILE
REGION OF NIAGARA, 1981

Industrial Sector	Employment	Percent
Agriculture	6,385	4.0
Forestry	105	0.1
Fishing	40	0.0
Mining (Aggregates)	425	0.3
Manufacturing	47,250	30.0
Construction	8,660	5.5
Transportation and Utilities	9,485	6.0
Trade	25,170	16.0
Finance and Insurance	6,420	4.1
Services	46,975	29.8
Public Administration and Defence	6,545	4.2
Total Regional Employment	157,460	100.0
Net Commuters*	9,385	
Total	166,845	

* Net commuters are defined to include residents of the region who work outside the region minus those working in the region but residing elsewhere.

Source: 1981 Census of Canada.

Industrial structure can be effectively determined through an examination of employment levels by industrial sector. A profile of employment for the Region of Niagara in 1981 is provided in Table 13.

The major employer in the Region of Niagara is General Motors of Canada. Other large manufacturing employers include Nabisco Brands Ltd. and Robin Hood Multifood Inc. (food), General Tire (rubber), Ontario Paper and Fraser Inc. (paper and allied products), Atlas Steel and Inco Ltd. (primary metals), Foster Wheeler Ltd. and Horton CBI Ltd. (metal fabricating), John Deere Ltd. (machinery) and Cyanamid Canada Inc. (chemicals). In addition to this manufacturing employment, the Region of Niagara has a large labour force engaged in tourism and agriculture.

3.2.3 THE EMPLOYMENT MULTIPLIER

The calculation of the employment multiplier used in the estimation of the economic base impacts of OWMC facilities on the economy of the Region of Niagara (and on the economy of the Region of Halton) is explained in detail in Appendix D. The method of calculation draws heavily upon the economic characteristics of the regional municipality. In particular: (1) regional employment by industrial sector is divided into basic and non-basic employment; (2) the effect of commuters on regional employment in the retail and service sectors is estimated; (3) the effect of unemployment rates on in-migration is estimated; and (4) the effect of potential employment losses resulting from the negative impacts of OWMC facilities on agriculture and tourism businesses is discussed in relation to the employment multiplier.

Basic/non-basic employment

Basic employment refers to those employees engaged in industries which export goods and services. Non-basic employment refers to those employees engaged in industries which serve the regional economy. The larger the ratio of total employment to basic employment, the greater the impact of a change in this basic employment (resulting from the multiplier effect).

Basic employment in the Region of Niagara is estimated at 52,995 employees in 1981.* This represents 33.7 percent of the total employment in the Region. This total is largely comprised of manufacturing employees (40,770), agricultural employees (6,385) and service sector employees (5,150). Most of the service sector employment which is classified as basic is employed in the food and accommodation industry.

Effect of commuters on the employment multiplier

Non-basic employment in any region, in addition to being supported by basic employment, is also supported by commuters (people working in one municipality but living in another municipality). In the Region of Niagara, the number of people living in the Region but working outside (out-commuters) exceeded the number of in-commuters by 9,385 people in 1981. Since these people bring income into the Region, which supports the retail and service sectors, their employment has an effect on the Regional economy similar to basic employment. Total basic employment plus net commuters in Niagara is therefore estimated to be 62,380 persons.

Effect of unemployment on the employment multiplier

The estimate of basic/non-basic employment implicitly includes the impact of expenditures (for both employed and unemployed persons) on total employment in Niagara. Since some of the jobs generated by OWMC facilities will be filled by the unemployed portion of the Region's population, the employment multiplier resulting from OWMC facilities will be lower. This effect is taken into account in the economic base impact analysis presented in this report.

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* See Appendix D, pages D-15 to D-25, for the detailed methodology used in this report to allocate industrial employment by sector into basic and non-basic employment.

In the Region of Niagara, data for the St. Catharines-Niagara Census Metropolitan Area shows the unemployment rate for the first half of 1985 to be 11.3 percent. In the analysis presented in Appendix D, it is assumed that 90 percent of the jobs generated by OWMC facilities will be filled by local labour. While total expenditures on goods and services will increase (because the incomes of those people receiving unemployment insurance and those individuals with no source of income will have increased), the increase in expenditures will be lower than if the jobs created were new sources of expenditure (i.e., the in-migration of labour supply). As a result, the employment multiplier for the Region of Niagara is reduced due to this income effect.

Industrial sectors where negative employment impacts could occur

The employment increase generated by OWMC facilities will be tempered by any employment loss in the economy as a result of OWMC facilities. Two industries which could face employment losses resulting from the location of OWMC facilities in the Region of Niagara are tourism and agriculture.

Tourism is an important industry in the economic base of the Region of Niagara. It is difficult to accurately estimate the employment relating to tourism because it crosses over into many industrial sectors and it requires a distinction between, for example, restaurant services supported by the local population and those which are supported by tourism. This level of detail is not readily available and can only be determined through a detailed survey and empirical research. Rough calculations for the economic base impact analysis conducted for this study estimate total basic employment related to tourism in Niagara at between 4,500 and 5,000 employees. This represents less than 5.0 percent of the Region's total employment.*

There have been concerns raised at public meetings and through discussions with municipal officials in the candidate municipalities that OWMC facilities would have a negative impact on tourism. The Laventhol & Horwath report estimates a total loss in jobs in tourism (and the induced employment resulting from those jobs) at between 160 and 180 person-years of employment for the two Niagara Falls siting options. This report found no evidence to suggest a decline in tourism in West Lincoln. The report further indicated that the exact determination of tourism employment loss resulting from the location of OWMC facilities in Niagara Falls requires greater empirical research.

The potential impacts of OWMC facilities on tourism employment are not incorporated into the economic base impact analysis undertaken in this report. In Phase 4A of the site selection process, tourism employment impacts are treated as a separate impact factor. If negative employment impacts in tourism-related industries do emerge as a result of OWMC facilities, the positive effects on employment and household growth resulting from these facilities estimated in this economic base impact analysis would be reduced (and consequently, the calculated employment multiplier for OWMC facilities would be reduced).

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* A study on the tourism impact of OWMC facilities (see Institute of Environmental Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Social Analysis, Appendices, Volume 4, Tourism Impacts, 1985, prepared by Laventhol & Horwath) estimated direct employment in the tourism industry for Niagara Falls at between 7,935-8,930 person-years. The estimate of tourism employment in the economic base impact analysis is derived by dividing employment into basic (i.e., export tourism services) and non-basic (employment serving the regional economy). The Laventhol & Horwath analysis of tourism impacts is based on an estimation of expenditure multipliers for tourists, transposed to an employment estimate. To obtain a more accurate estimate of tourism employment which could reconcile the difference between the two estimates requires greater empirical research.

It is clear that OWMC facilities will have some negative impact on agricultural employment. There will be on-site farm operation displacements and a disruption of farm operations in the site vicinity.* The actual impacts of the facilities on agricultural employment have not been estimated as part of this economic base impact analysis because it is outside the terms of reference for this study. In addition to the number of direct jobs lost through farm displacement, there could be an indirect loss of jobs from employers such as farm implement dealers and feed mills. Both these impacts would also reduce employment in the service and retail sectors.

TABLE 14

EMPLOYMENT PROFILE
REGION OF NIAGARA, 1981, PERCENT

	Niagara Falls	West Lincoln	Rest of Region	Total
Agriculture	1.0	30.5	4.2	4.0
Manufacturing	24.5	13.7	31.7	30.0
Services*	63.6	37.3	52.2	54.1
Other**	10.9	18.5	12.0	11.9
Total***	100.0	100.0	100.0	100.0

* Includes trade, finance and insurance, community services and public administration and defence.
** Includes forestry, fishing and mining, construction, transportation and utilities.
*** Totals may not add due to rounding.

Source: 1981 Census of Canada.

All siting options in West Lincoln and Niagara Falls would impact the agricultural economy on-site and in the site vicinity. Since West Lincoln has a higher proportion of its employment engaged in agriculture than does Niagara Falls (30.5 percent versus 1.0 percent), the negative impacts of OWMC facilities on employment in the agriculture sector will have a greater relative impact in West Lincoln. An accurate estimate of the negative agricultural employment impacts of the alternative siting options can only be determined by greater empirical analysis (which should be undertaken in the Phase 4B detailed analysis of the preferred siting option).

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* For a discussion of this, see Ecologistics Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985.

While estimates of potential employment loss in the agriculture and tourism sectors have not been quantified in the economic base impact analysis, they are incorporated into the comparative evaluation of siting options (in Chapter 5) through qualitative considerations and are considered in an appendix, along with the economic base impacts identified in this study, to a report by M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

Estimate of the employment multiplier

The employment multiplier calculated for the Region of Niagara in the economic base analysis presented in Appendix D is 1.71 (i.e., for every direct job created by OWMC facilities, there will be .71 of another job created in the service and retail sectors). The calculation of this estimate takes into account the Region's basic/non-basic employment ratio, the effect of commuters and unemployment considerations but excludes any negative impact of OWMC facilities on agriculture and tourism employment.

3.2.4 HOUSEHOLD GROWTH

Household growth is expected to occur in the candidate municipalities as a result of the employment created by OWMC facilities. The lower the employment multiplier for these facilities, the less regional employment created and the fewer the number of households generated (the reverse is also true).

As indicated in Chapter 2, household growth in the economic base impact analysis is forecast for the regional level and is distributed among area municipalities based on assumptions of the proportion of the employed labour force in the area municipality that also resides in the area municipality.

Data on the commuting patterns of employees is available for candidate area municipalities from the 1981 Census of Canada. In West Lincoln, the proportion of resident (non-agricultural) workers was estimated to be 64 percent in 1981. In Niagara Falls, the proportion of the non-agricultural workers living in that City was 81 percent.

The above data refer to all employed persons in the candidate municipality. These proportions must be adjusted when specific siting options are considered. In West Lincoln, siting options LF-3C and LF-9C are both located in rural parts of the Township, away from any urbanized areas. Siting option LF-9C is also located close to the Region of Haldimand-Norfolk; this Region is therefore expected to attract a greater share of the household growth generated by OWMC facilities under siting option LF-9C than under siting option LF-3C. The two siting options in Niagara Falls are located on the fringe of the urbanized area of that City and should also have a lower proportion of resident employees than the area municipality average exhibited by the 1981 Census of Canada.

The assumption used in this economic base impact analysis is that West Lincoln will attract 50 percent of the household growth in the Region of Niagara attributable to OWMC facilities on siting option LF-3C and 40 percent from facilities on LF-9C. Niagara Falls is expected to attract 70 percent of the household growth in the Region of Niagara attributable to OWMC facilities located on either of the two siting options in that municipality.

3.2.5 ANTICIPATED FUTURE TRENDS IN ECONOMIC DEVELOPMENT

Like most regions in Ontario, industrial development slowed considerably in the Region of Niagara between 1978 and 1984. In the City of Niagara Falls, industrial land absorption averaged only nine hectares per year during this period, down from an average of 23 hectares per year during the early 1970s.*

Industrial growth in West Lincoln has also been very slow in recent years. West Lincoln has one small municipally-owned industrial park in the Town of Smithville which contains some 320 industrial jobs. The largest industry, General Refractories Company, employs 103 people. The Smithville industrial park is located approximately 20 kilometres to the north of the two siting options in West Lincoln. The industrial park is only partly developed and should accommodate future industrial growth in West Lincoln.

Niagara Falls has some 1,588 hectares of land which is vacant and designated for industrial development. These lands should accommodate all industrial growth in Niagara Falls for the foreseeable future.

The combination of slow growth and readily available industrial land in both candidate area municipalities means that while the economic base of these municipalities has capacity for accommodating additional growth, it is likely that any change over the next decade will be modest. It is concluded, therefore, that the impacts of OWMC facilities on the economic base which have been estimated for the year 1984 will not change significantly over the next decade.

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* Woods Gordon, Regional Niagara Economic Development Study, Technical Report, 1980, Table 17.

3.3 COMMUNITY AND REGIONAL ECONOMIC BASE CHARACTERISTICS - REGION OF HALTON

3.3.1 OVERVIEW

The economic base of the Region of Halton is characterized by a large manufacturing and service sector. The major manufacturing industries in the Region include the transportation, metal fabricating and meat processing industries. A large proportion of the residents in the Region work outside the Region, primarily in the Toronto and Hamilton areas.

The Town of Milton tends to specialize in agriculture, trade and the mining of aggregates. A large number of quarries and aggregate operations are located along the neighbouring Niagara Escarpment. The Town's major industrial area is adjacent to Highway 401 on the northern edge of the urban area. The two siting options in Milton, LF-4N/PI-1N and LF-4N/PI-13N, are located south of the built-up area and are some distance from the developed industrial areas. Except for a recent project by Magna International, little new industrial development has occurred in Milton in recent years.

TABLE 15

SELECTED ECONOMIC INDICATORS
REGION OF HALTON, 1980 AND 1981

Municipality	Area	Total Employment 1981	Total Population 1981	Total Households 1981	Total Household Income 1980
	Hectares	Persons		Households	Millions ($)
Milton	37,088	10,825	28,067	8,505	260
Rest of Region	61,217	90,680	225,816	73,070	2,367
Total	98,305	101,505	253,883	81,575	2,627

Source: Ministry of Municipal Affairs and Housing, Municipal Directory, 1985 and 1981 Census of Canada.

3.3.2 INDUSTRIAL STRUCTURE AND EMPLOYMENT

TABLE 16

EMPLOYMENT PROFILE
REGION OF HALTON, 1981

Industrial Sector	Employment	Percent
Agriculture	2,705	2.7
Forestry	10	0.0
Fishing	10	0.0
Mining (Aggregates)	380	0.4
Manufacturing	29,240	28.7
Construction	5,960	5.9
Transportation and Utilities	4,245	4.2
Trade	20,645	20.3
Finance and Insurance	5,110	5.0
Services	28,960	28.4
Public Administration and Defence	4,515	4.4
Total Regional Employment	101,780	100.0
Net Commuters*	29,275	
Total	131,055	

* Net commuters are defined to include residents of the region who work outside the region minus those working in the region but residing elsewhere.

Source: 1981 Census of Canada.

A profile of employment for the Region of Halton in 1981 is provided in Table 16.

Similar to the situation in the Region of Niagara, the major employer in the Region of Halton is in the transportation sector, the Ford Motor Company assembly plant in Oakville. Other large employers include F.W. Tearman Co. (meat processing), Bonar Packaging Ltd. (rubber and plastics), Frankel Steel Ltd. and Butler Manufacturing Co. (metal fabricating), General Electric Co. and Varion Canada Inc. (electrical), Smith and Stone Inc. (non-metallic minerals) and Petro-Canada Inc. (refinery for petroleum products).

3.3.3 THE EMPLOYMENT MULTIPLIER

Considerations included in the calculation of the employment multiplier for the Region of Halton are: (1) an analysis of regional basic and non-basic employment; (2) an estimate of the effect of commuters on regional employment in the retail and service sectors; (3) an estimate of the effect of unemployment rates on in-migration; and (4) an estimate of the effect of potential employment losses resulting from the negative impacts of OWMC facilities on agriculture and tourism businesses.

Basic/non-basic employment

Basic employment in the Region of Halton was reported to be 28,840 employees in 1981. This represents 23.6 percent of total employment in the Region. This total was almost entirely accounted for by the manufacturing sector, where there were 24,050 employees in basic industries. The only other sector classified as basic and having a large number of employees in Halton is the agriculture industry, which had 2,705 employees in 1981.

The number of non-basic employees in the Region of Halton totalled 72,940 in 1981. While this level of employment is in part supported by basic employment in Halton, it is also supported by those residents who work outside the region.

Effect of commuters on the employment multiplier

The number of people living in Halton but working outside the Region (out-commuters) exceeds the number of in-commuters by 29,275 persons. Since these people bring income into the Region, which supports the retail and service sectors, their employment has an effect similar to basic employment. Total basic employment plus net commuters in Halton is thus estimated to total 58,115 persons.

Effect of unemployment on the employment multiplier

There are no separate unemployment statistics for the Region of Halton. As a substitute, the average unemployment rates for the first half of 1985 in the Toronto and Hamilton Census Metropolitan Areas, which were approximately 9.0 percent, are assumed to be representative of the unemployment rate in the Region of Halton. This available labour supply is expected to fill a number of the jobs created by OWMC facilities, however, since the unemployment rate for Halton is estimated to be lower than that of Niagara, the proportional reduction in the employment multiplier is less.

In the analysis presented in Appendix D, it is assumed that 60 percent of the jobs generated by OWMC facilities will be filled by local labour. While total expenditures on goods and services will increase (because the incomes of those people receiving unemployment insurance and those individuals with no source of income will have increased), the increase in expenditures will be lower than if the jobs created were new sources of expenditure (i.e., the in-migration of labour supply). As a result, the employment multiplier for the Region of Halton is reduced due to this income effect.

Industrial sectors where negative employment impacts could occur

The presence of OWMC facilities could have a negative impact on employment in the tourism sector. However, the study by Laventhol & Horwath, which is included as an appendix to a Phase 4A report on social impacts by the Institute of Environmental Research Inc., concluded that there would be no negative employment impacts in the tourism industry in the Region of Halton as a result of locating OWMC facilities on either of the two Milton siting options.* This nil impact is considered as a separate factor (outside the economic base impact analysis) in Phase 4A of the site selection process.

The possible impact of OWMC facilities on agricultural employment in the Region of Halton, while negative due to farm displacement on-site and the disruption of farm operations in the site vicinity, has not been determined in this analysis.**

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* See Institute of Environmental Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Social Analysis, Appendices, Volume 4, Tourism Impacts, 1985, prepared by Laventhol & Horwath.

** For a discussion of estimates of impacts of OWMC facilities on agricultural employment, see Ecologistics Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985.

A profile of employment in Milton by major industrial sector is shown on Table 17.

TABLE 17

EMPLOYMENT PROFILE
REGION OF HALTON, 1981, PERCENT

	Milton	Rest of Region	Total
Agriculture	8.7	1.9	2.7
Manufacturing	22.4	29.5	28.7
Services*	58.1	58.3	58.2
Other**	10.8	10.3	10.4
Total***	100.0	100.0	100.0

* Includes trade, finance and insurance, community services and public administration and defence.

** Includes forestry, fishing and mining, construction, transportation and utilities.

*** Totals may not add due to rounding.

Source: 1981 Census of Canada.

Similar to West Lincoln in the Region of Niagara, agricultural employment in Milton as a proportion of total employment is much higher than for Halton as whole but is still comparatively small. It is also likely that a loss of jobs in the agriculture sector in Milton could result in a loss of jobs in related industries such as farm implement dealers and feed mills. The overall effect of an employment loss in agriculture as a result of OWMC facilities would be a reduction in the employment multiplier. However, the extent of this reduction can only be determined through greater empirical analysis.

While estimates of potential employment loss in the agriculture and tourism sectors have not been quantified in the economic base impact analysis, they are incorporated into the comparative evaluation of siting options (in Chapter 5) through qualitative considerations and, as noted earlier, are considered in an appendix, along with the economic base impacts identified in this study, to a report by M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

Estimate of the employment multiplier

The employment multiplier calculated for the Region of Halton in the economic base analysis presented in Appendix D is 1.67 (i.e., for every direct job created by OWMC facilities, there will be .67 of another job created in the service and retail sectors). The calculation of this estimate takes into account the Region's basic/ non-basic employment ratio, the effect of commuters and unemployment considerations but excludes any negative impact of OWMC facilities on agriculture and tourism employment.

3.3.4 HOUSEHOLD GROWTH

The method of estimating and allocating regional household growth generated by OWMC facilities among area municipalities is described in Chapter 2 and summarized on page 57 of this chapter.

The total number of households generated by OWMC facilities in the Region of Halton is estimated at 172. A portion of this growth can be allocated to Milton by examining the commuting patterns of employees in this Region.

In 1981, 57 percent of all non-agricultural employees in Milton were residents. The location of the two siting options, to the south of the Town, provides easier access to other parts of the region than to Milton. Therefore, it is likely that the proportion of the household growth resulting from OWMC facilities residing in Milton will be lower than that suggested by the 1981 Census data. It is assumed in this analysis that 45 percent of the households generated by OWMC facilities in Halton will reside in Milton.

3.3.5 ANTICIPATED FUTURE TRENDS IN ECONOMIC DEVELOPMENT

Industrial land absorption in Milton averaged five hectares per year in the early 1970s and dropped to three hectares during the late 1970s and early 1980s. The major source of new industrial land in Milton is the Milton 401 Industrial Park. The southern portion of this park was opened in 1981 and can only accommodate "dry" industrial uses (using less than 3,000 litres of water per hectare per day) due to the servicing constraints of the Town's waste water treatment plant. The industrial park has recently attracted a large firm (Magna International). The total undeveloped area of the industrial park is in excess of 500 hectares.*

The restrictions to growth imposed by the lack of capacity in Milton's waste water treatment plant, plus the slow rate of industrial growth in recent years, provides an indication that growth in Milton over the next decade is likely to continue to be slow. The construction of OWMC facilities in the late 1980s and their operation in the early 1990s would not significantly change the economic base impacts which have been estimated for 1984.

3.4 MARKET VALUE OF PROPERTIES IN THE SITE VICINITY

An estimate of the market value of properties in the site vicinity of OWMC facilities is provided in this section. This discussion is presented by siting option rather than by community and region since the property value impacts of OWMC facilities are assumed to occur only in the site vicinity areas of the siting options.

The size of the site vicinity areas of the six candidate siting options are measured in terms of a 1,500 metre radius around the maximum potential acquisition boundary of each site. For partially integrated siting options, which consist of two candidate sites (LF-1E/PI-27E, LF-4N/PI-1N and LF-4N/PI-13N), the site vicinity is larger than for the fully integrated siting options which consist of only one site, i.e., siting options LF-3C, LF-9C and LF-1E.

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* Interview with Town of Milton chief administrative officer, September 5, 1984.

The characteristics of properties in the site vicinity of the siting options are shown in Table 18. Farm or vacant properties dominate the land use for each siting option; only siting option LF-4N/PI-13N in Milton has a large number of non-farm properties. With the exception of siting option LF-1E/PI-27E, virtually all land (95 percent or more) in the site vicinity of the siting options is assessed as farm or vacant land. For siting option LF-1E/PI-27E, 87 percent of the land is assessed as farm or vacant land.

TABLE 18

CHARACTERISTICS OF PROPERTIES IN THE SITE VICINITY OF THE CANDIDATE SITING OPTIONS

Siting Option	Candidate Municipality	Number of Properties			Area (Hectares)	Proportion of Total Area Assessed as Farm/Vacant (Percent)
		Farm/ Vacant	Non-Farm	Total		
LF-3C	West Lincoln	81	22	103	1,609	99
LF-9C	West Lincoln	69	23	92	1,344	99
LF-1E	Niagara Falls	115	40	155	1,306	95
LF-1E/PI-27E	Niagara Falls	155	36	191	2,218	87
LF-4N/PI-1N	Milton	132	50	182	2,441	99
LF-4N/PI-13N	Milton	142	78	220	2,737	99

Source: Municipal Assessment Rolls.

The estimated market value of properties in the site vicinity of each siting option is shown in Table 19.

TABLE 19

ESTIMATED MARKET VALUE OF PROPERTIES IN THE VICINITY OF SITING OPTIONS 1984, DOLLARS (MILLIONS)

Siting Option	Candidate Municipality	Type of Property			Total
		Farm/ Vacant	Residential	Commercial/ Industrial	
LF-3C	West Lincoln	5.6	0.6	0.1	6.3
LF-9C	West Lincoln	5.3	0.5	0.0	5.8
LF-1E	Niagara Falls	5.8	3.0	0.2	9.0
LF-1E/PI-27E	Niagara Falls	10.5	3.1	11.7	25.3
LF-4N/PI-1N	Milton	14.8	3.9	0.1	18.8
LF-4N/PI-13N	Milton	17.7	7.7	0.0	25.4

Source: Appendix Table C-3

It is these market values which are used in the estimation of the property value impacts of OWMC facilities in the site vicinity of each siting option. Total market values are the lowest for the two West Lincoln siting options due to the large proportion of land in their site vicinity which is classified as farm land. The properties in the site vicinity of the two siting options in Milton and the siting option in Niagara Falls with two sites, LF-1E/PI-27E, have a much higher market value than the other siting options. Included in the market value estimates for LF-1E/PI-27E are two firms, the Ford Motor Company glass plant and Cyanamid Inc., whose property values are not anticipated to be negatively affected by OWMC facilities. When the market values of these two properties are netted out of the total market value of property in the site vicinity of LF-1E/PI-27E, the estimated market value of this property drops to $15.4 million.*

3.5 BUSINESSES IN THE SITE VICINITY OF OWMC FACILITIES

Since the impacts of OWMC facilities on agriculture are being considered as a separate factor in Phase 4A of the site selection process, only the impacts of OWMC facilities on non-farm businesses in the site vicinity are considered in this economic base impact analysis.** In the previous chapter, two factors were introduced which estimated the impacts of OWMC facilities on existing businesses in the site vicinity: business activity positively affected by the presence of OWMC facilities; and business activity negatively affected by the presence of OWMC facilities.

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* For a discussion of the estimation of property market values, see Appendix C.

** For a discussion of agricultural impacts, see Ecologistics Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985.

Characteristics of businesses in the site vicinity of the siting options are shown on page 67. The following businesses are located in the vicinity of each candidate site:

- LF-3C (West Lincoln) - private school, seeds distribution, transmission repair, custom operator, turkey raising, horse training, silo construction, manufacturer of bird houses, dairy services.

- LF-9C (West Lincoln) - custom operator (considered to be an agri-business), cash crops, crop insurance, variety store/garage, scrap dealer, rifle range, swimming pool installation.

- LF-1E (Niagara Falls) - horse breeding, cash crops, bee- keeping, dog kennel, knitting, automobile sales, farm equipment repair, golf and country club, meat packer, service station, sandblasting, heavy equipment/house mover, salvage, ethnic community club, automobile garage/leasing.

- PI-27E (Niagara Falls) - golf and country club, trailer campground, cash crops, dog kennel, aluminium siding, truck transportation, glass fabrication, chemical manufacturing, scrap material, excavation/construction, motel/restaurant, plastics manufacturer, pre-cast concrete, auto wrecking, ethnic community club, livestock broker, eggs, building demolition, woodworking, industrial tools, industrial equipment.

- LF-4N (Milton) - custom operator, horse breeding, cash crops, orchards, ceramics studio, plant nursery, snack bar/restaurant, plastics manufacturer, automobile dealership, grain dealer, livestock raising, industrial meters.

- PI-1N (Milton) - horse boarding and breeding, livestock raising and breeding, horseback riding, market gardening, abattoir, cabinet maker, dog kennel, artist, truck haulage, custom operator, orchards, ceramics studio, TV antenna installation, ethnic community club.

- PI-13N (Milton) - golf and country club, horse breeding and boarding, plant nursery, soccer supplies, sale of exotic birds, snow removal/landscaping, service station/snack bar, pick-your-own produce.

The determination as to whether the economic impacts of OWMC facilities on their businesses would be positive or negative was primarily decided by the business operators themselves, through a business survey. Where the response was questionable, given the nature of the business responding, an adjustment was made to the response by Clayton Research Associates. These adjustments were normally undertaken where the respondent was unsure of the possible impacts of OWMC facilities. Their responses were thus estimated based on responses made by similar business respondents in similar locations. The estimate of the facilities impact on the site vicinity of the siting options is obtained through estimates of the number of businesses affected, the number of employees affected and the annual sales of the businesses affected.

CHAPTER 4

BASIC ACCEPTABILITY

The basic acceptability analysis is performed by each site selection consultant to determine if any impacts have been identified which are severe enough to offset any other siting considerations and would warrant the rejection of a siting option.

Many of the impacts identified in the economic base analysis are positive impacts. The expected employment and household growth resulting from OWMC facilities will have a positive effect on the economies of the candidate municipalities. There are also a number of identified business operations in the candidate municipalities that will benefit from the services provided by OWMC facilities. The negative impacts include displacement of on-site businesses and negative impacts on property values in the site vicinity. The displaced businesses will be compensated by OWMC and the negative impact on property values in the site vicinity could be ameliorated by a compensation package provided to affected property owners. A number of business operators contacted during the business survey anticipated that the presence of OWMC facilities in their vicinity would have a negative impact on business. These anticipated impacts could be reduced over time once OWMC facilities are in operation and become an accepted part of the local economy.

Since the impacts of OWMC facilities for the economic base component are expected to be small, all candidate siting options meet basic acceptability criteria.

As a result of the basic acceptability analyses undertaken by other site selection team members, a decision was made to drop site LF-2N in Mississauga from further consideration because the site

site could not ensure natural containment.*

The siting options evaluated in the comparative evaluation process of economic base impacts in the next chapter are:

LF-3C
LF-9C
LF-1E
LF-1E/PI-27E
LF-4N/PI-1N
LF-4N/PI-13N

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* For a more detailed discussion of this, see M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Interim Site Selection Report, Candidate Site LF-2N, 1985.

CHAPTER 5

COMPARATIVE EVALUATION PROCESS

5.1 PURPOSE

The purpose of this chapter is to provide a detailed comparative evaluation of the economic base impacts of the special waste treatment and disposal facilities proposed by OWMC on the six remaining siting options. The objective of this comparative evaluation process is to rank the siting options with respect to the economic base factors.

In the previous chapters, data were presented on the economic base of the candidate area and regional municipalities and on the various impacts, both positive and negative, of OWMC facilities on the economic base of these municipalities. This chapter concentrates on the differences in the impacts of the six siting options on the economic base of the candidate municipalities.

The comparative evaluation undertaken in this chapter assumes that OWMC facilities are in operation in 1984. Much of the economic base data gathered through surveys were collected in 1984. Other data from the 1981 Census of Canada, Statistics Canada and the Ministry of Revenue are assumed to apply to 1984.

The chapter first identifies the six siting options under consideration. This is followed by a list of assumptions made during the analysis and the comparative evaluation process. The actual comparison and evaluation of economic base impacts involves a multi-stage process of identifying, screening, ranking and aggregation of factors, indicators and sub-indicators. The factors, indicators and sub-indicators used in this evaluation were identified in Chapter 2. The comparative evaluation process is undertaken by first screening the factors, indicators and sub-indicators to determine their appropriateness for comparing and ranking siting options. Any modifications and additions made to the factors, indicators and sub-indicators are noted. Next, the indicators and sub-indicators are scaled by siting option and then are ranked and aggregated. The final step in the comparative evaluation process is to rate each siting option by factor suitability level. The chapter ends with a discussion of major differences in economic base impacts between siting options.

5.2 SITING OPTIONS UNDER CONSIDERATION

The comparative evaluation process of economic base impacts was undertaken for six siting options. These include:

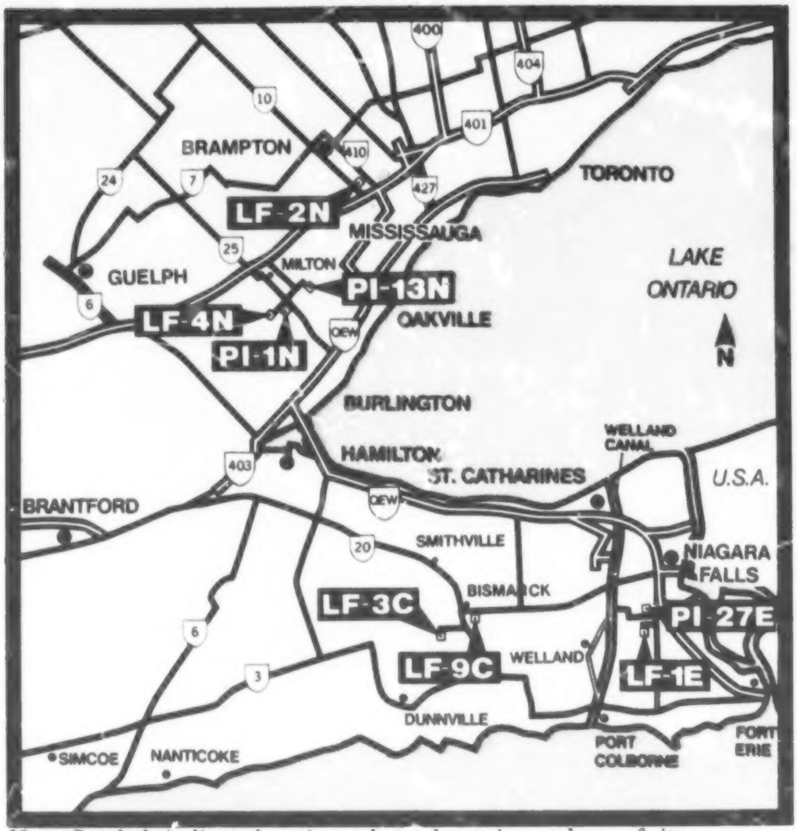
- West Lincoln - LF-3C
  - LF-9C

- Niagara Falls - LF-1E
  - LF-1E/PI-27E

- Milton - LF-4N/PI-1N
  - LF-4N/PI-13N

These siting options are shown on Figure 4.

Figure 4
Candidate Sites


400
404
10
401
BRAMPTON
410
24
7
427
TORONTO
LF-2N
MISSISSAUGA
LAKE ONTARIO
25
MILTON
GUELPH
PI-13N
6
LF-4N
OAKVILLE
QEW
PI-1N
N
BURLINGTON
WELLAND CANAL
HAMILTON
403
ST. CATHARINES
U.S.A.
BRANTFORD
QEW
20
SMITHVILLE
NIAGARA FALLS
BISMARCK
LF-3C
PI-27E
6
WELLAND
LF-9C
LF-1E
3
DUNNVILLE
PORT COLBORNE
FORT ERIE
SIMCOE
NANTICOKE

Note: Symbols indicate location only, and not size or shape of sites.

Site Name	Landfill	Physical/ Chemical	Incinerator	
LF-2N	●	●		
LF-4N	●	●		
LF-3C	●	●	●	Integrated
LF-9C	●	●	●	Integrated
LF-1E	●	●	●	Integrated
PI-1N		●	●	
PI-13N		●	●	
PI-27E		●	●	

OWMC, 1985.

LEGEND

0 10
Kilometres
0 10
Miles

- ▫ Candidate Sites
- ═ 400 Series Highways
- — Other Highways & Roads

5.3 STATEMENT OF GENERAL ASSUMPTIONS

The key assumptions used in the comparative evaluation of economic base impacts of alternative siting options are stated below. The support for these assumptions have previously been discussed in Chapters 2 and 3. Other less significant assumptions which have been made are discussed in Appendices B through F.

The key assumptions regarding the characteristics of the proposed facilities include the following:*

- The facilities will consist of an incinerator, a physical/chemical treatment and solidification plant and an engineered landfill.
- All treated wastes will be solidified and deposited in the engineered landfill.
- The facilities will have a capacity to process 300,000 tonnes of special wastes per year.
- The direct employment at OWMC facilities is expected to range from 217 to 221 employees depending upon the siting option.
- Road access and property boundaries for OWMC facilities were recommended by the site selection team. The estimated area for each siting option is as follows:

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* See Monenco Limited, Facility Design, 1985 and Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

LF-3C	206 hectares
LF-9C	135 hectares
LF-1E	273 hectares
LF-1E/P1-27E	323 hectares
LF-4N/PI-1N	343 hectares
LF-4N/PI-13N	338 hectares

The key economic base assumptions include the following:

- Economic base impacts are calculated to reflect existing conditions (i.e., 1984 as the year of operation).
- Agricultural and tourism considerations were to be analyzed and evaluated as separate factors in the site selection process and were not included in the economic base impact analysis.
- There will be no industrial spin-off associated with OWMC facilities (i.e., no new firms will locate near the facilities because of services or products provided by the facilities).
- The impact of OWMC facilities on household growth is directly related to employment growth. The allocation of household growth to candidate area municipalities is based on existing commuting patterns of employees within that area municipality and within the candidate regional municipality.
- There will be no out-migration from the municipality containing the preferred site for OWMC facilities, beyond the out-migration from the site area.
- Negative property value impacts will decline with distance from the facilities site and will vary by type of property.

5.4 OVERVIEW OF THE COMPARATIVE EVALUATION PROCESS

The purpose of this section is to outline the process utilized to rank and aggregate the indicators and sub-indicators associated with the economic base factors across all siting options. This procedure was formulated by M.M. Dillon Limited in consultation with the site selection team. All consultants adapted the procedure to suit their own data.

The identification of factors, indicators and sub-indicators in the comparative evaluation process is directed at comparing siting options for the proposed facilities for a variety of impacts, risks and engineering cost considerations.

The five economic base factors are impact factors, as opposed to risk factors or engineering cost considerations. The five factors, and their associated study areas, identified for the comparative evaluation of economic base impacts in the site selection process are as follows:

SITE

- Displacement of business activity;

SITE VICINITY

- Property value impacts;
- Business activity positively affected by the presence of OWMC facilities;
- Business activity negatively affected by the presence of OWMC facilities; and

COMMUNITY AND REGIONAL

- Community and regional economic base.

The study areas identified - site, site vicinity and community and regional - encompass zones of influence for the factors. The site refers to the land required for OWMC facilities (physical/chemical treatment and solidification plant, incinerator, landfill and buffer zone), the site vicinity is the area approximately two kilometres around the centre of the site and community and regional refers to the candidate area and regional municipalities.

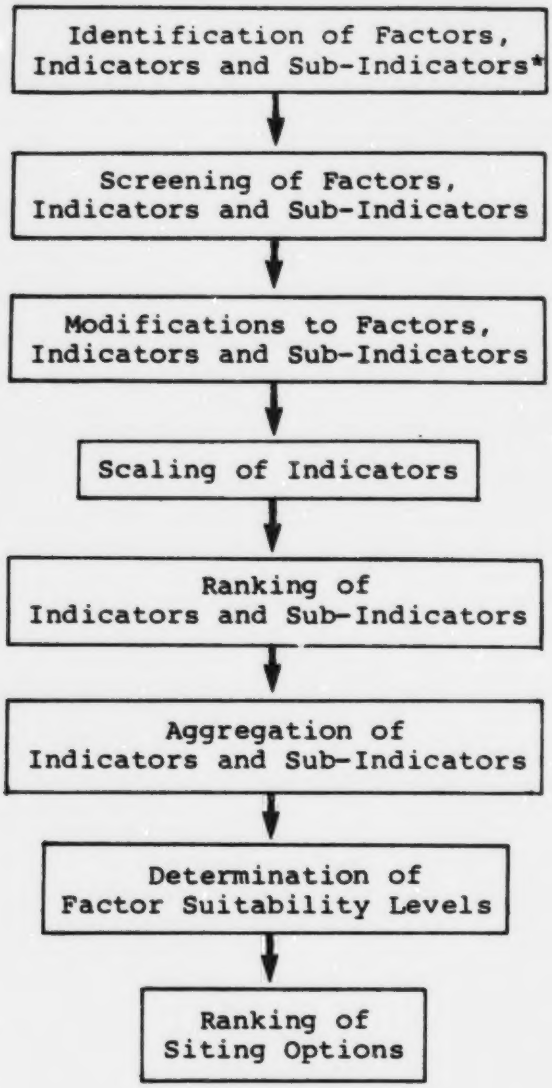
Economic base factors estimate both the positive and negative impacts of OWMC facilities. One factor estimates a positive impact - business activity positively affected by the presence of OWMC facilities. Three factors estimate negative impacts - displacement of business activity, property value impacts and business activity negatively affected by the presence of OWMC facilities. The community and regional economic base factor has several indicators and sub-indicators which estimate both positive and negative impacts. Whether this last factor estimates a positive or negative impact in total can only be determined following the ranking and aggregation of the indicators and sub-indicators associated with this factor.

An indicator in the comparative evaluation process provides a measurable description of a factor which allows consistent and relative comparisons between siting options. These indicators are ranked in importance and then aggregated by siting option. Sub-indicators provide a measurable description of an indicator across siting options and are also ranked and aggregated.

A process of ranking siting options by factors was employed for the comparative evaluation process of siting options. This process, which has been adopted for this report, is illustrated in Figure 5.

FIGURE 5

SITING OPTION RANKING PROCESS


Identification of Factors, Indicators and Sub-Indicators*
Screening of Factors, Indicators and Sub-Indicators
Modifications to Factors, Indicators and Sub-Indicators
Scaling of Indicators
Ranking of Indicators and Sub-Indicators
Aggregation of Indicators and Sub-Indicators
Determination of Factor Suitability Levels
Ranking of Siting Options

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* See Chapter 2 for identification of factors, indicators and sub-indicators.

Following a brief discussion regarding data sources, this framework is used as the guideline for discussion in the remainder of this chapter.

5.5 DATA SOURCES

Earlier chapters in this report presented a description and analysis of data relating to the economic base environment of the candidate municipalities. Table 20 presents a summary of the data sources for the economic base factors and indicators. A summary of data used in the comparative evaluation of siting options for economic base impacts is presented in Table 21.

5.6 SCREENING OF FACTORS, INDICATORS AND SUB-INDICATORS

The purpose of establishing factors, indicators and sub-indicators in the comparative evaluation process is to compare siting options. The preliminary factors, indicators and sub-indicators for evaluating economic base impacts, which were established at the beginning of Phase 4A of the site selection process, are shown in the first column of Table 22. Following the data collection and analysis process, these factors, indicators and sub-indicators were evaluated to determine if they should be screened (eliminated) or modified.

The following guidelines were used in the screening of factors, indicators and sub-indicators to determine if they were to be utilized. Factors, indicators and sub-indicators were not utilized where:

TABLE 20

DATA SOURCES FOR THE ECONOMIC BASE FACTORS

Factor	Indicator	Data Sources
Displacement of Business Activity	• Number of businesses • Number of employees • Annual sales	- Business survey, Clayton Research Associates - Business Directories, Regions of Halton and Niagara
Property Value Impacts		- Review of case studies, Clayton Research Associates - Property ownership maps, Ecologistics Limited - Real property assessment estimates and information, Ministry of Revenue
Business Activity Positively Affected by OWMC Facilities	• Number of businesses • Number of employees • Annual sales	- Business survey, Clayton Research Associates
Business Activity Negatively Affected by OWMC Facilities	• Number of businesses • Number of employees • Annual sales	- Business survey, Clayton Research Associates
Community and Regional Economic Base	• Number of new jobs created	- OWMC employment estimates, Monenco Limited - Economic base analysis and employment multipliers, Clayton Research Associates - Industrial spin-offs, Institute of Environmental Research
	• Number of additional households created	- Place of work data, 1981 Census - Household growth estimates by candidate municipality, Clayton Research Associates
	• Perceptions of community economic impact	- Business survey, Clayton Research Associates

TABLE 21

ECONOMIC BASE DATA SUMMARY FOR COMPARATIVE EVALUATION OF SITING OPTIONS

		Siting Options					
		Region of Niagara				Region of Halton	
		West Lincoln		Niagara Falls		Milton	
Study Area	Factor/Indicator/Sub-Indicator	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Site	Displacement of Business Activity						
	Number of businesses	0	0	6	7	5	3
	Number of employees	0	0	22	33	14	8
	Annual sales ($000)	0	0	1,741	2,616	709	269
Site Vicinity	Property Value Impacts ($000)	-451	-435	-679	-1,050	-1,487	-1,912
	Business Activity Positively Affected by the Presence of OWMC Facilities						
	Number of businesses	0	1	1	12	1	2
	Number of employees	0	3	2	1,450	125	129
	Annual sales ($000)	0	68	100	81,928	7,500	7,568
	Business Activity Negatively Affected by the Presence of OWMC Facilities						
	Number of businesses	9	4	6	12	14	16
	Number of employees	69	9	18	69	39	91
	Annual sales ($000)	2,348	355	1,333	2,192	1,473	4,318
Community and Regional	Community and Regional Economic Base						
	Number of new jobs created	316	356	395	422	331	331
	Number of additional households created						
	- area municipality	67	60	116	125	77	77
	- regional municipality	133	150	165	178	172	172
	Perceptions of community economic impact						
	- number of businesses perceiving positive impacts	5	5	7	19	6	7
	- number of businesses perceiving negative impacts	20	19	9	21	20	21

Source: Tables 5, 6, 7, 8, 9, 10 and 11.

- There were no or negligible differences among the siting options;

- The factors, indicators or sub-indicators could not be put into effect (due to measurement problems, etc.); or

- There were no or negligible levels of impact.

A summary of the screening process for factors, indicators and sub-indicators is provided in Table 22. None of the preliminary factors, indicators or sub-indicators which were identified at the beginning of Phase 4A of the site selection process were screened from the analysis. All were found to provide a reasonable estimate of economic base impacts of OWMC facilities within the criteria established above.

5.7 MODIFICATIONS TO FACTORS, INDICATORS AND SUB-INDICATORS

While no factors, indicators or sub-indicators were screened from the economic base analysis, a number of modifications and additions were identified through the data collection and analysis process. These are also shown in Table 22 as are the rationale for these changes. The names of four factors were changed to more accurately reflect the economic base impact being estimated. The most significant change made to any of the factors was the division of the operation of commercial and industrial businesses factor into two factors, one representing positive impacts on business activity and the other negative impacts on business activity. In addition to the factor changes, the indicators for most factors were divided into two or more indicators to provide increased information. Indicators such as the number and characteristics of businesses be-

TABLE 22

CHANGES IN FACTORS/INDICATORS/SUB-INDICATORS
ECONOMIC BASE IMPACT ANALYSIS

Preliminary Phase 4A Factors/Indicators/ Sub-Indicators	Modified Phase 4A Factors/Indicators/ Sub-Indicators	Screened	Addition	Modification	Comments
Displacement of Existing Commercial and Industrial Uses • Number of businesses • Characteristics of businesses displaced	Displacement of Business Activity • Number of businesses • Number of employees • Annual sales		X		- Indicator divided into two indicators to provide increased information
Economic Stability of Residents • Change in property values	Property Value Impacts			X	- Factor name modified to more accurately reflect impacts
Operation of Commercial and Industrial Businesses • Number and characteristics of businesses • Effect on businesses	Business Activity Positively Affected by the Presence of OWMC Facilities • Number of businesses • Number of employees • Annual sales Business Activity Negatively Affected by the Presence of OWMC Facilities • Number of businesses • Number of employees • Annual sales		X	X	- Factor divided into two factors to provide separate information on positive and negative impacts - Indicators added to provide increased information
Economic Base • Nature of economic base • Economic effects (income, employment and retail sales)	Community and Regional Economic Base • Number of new jobs created • Number of additional households created - area municipality - regional municipality • Perceptions of community economic impact - number of businesses perceiving positive impacts - number of businesses perceiving negative impacts	X	X	X	- Factor name changed to include study area - Indicators added to provide increased information - Some sub-indicators were screened due to minimal facilities impact on them

came three indicators: number of businesses, number of employees and annual sales. The number of indicators for the economic base factor (the name of which was changed to community and regional economic base) increased from two to three and four new sub-indicators were added.

The modified list of factors, indicators and sub-indicators for the economic base analysis includes five factors, twelve indicators and four sub-indicators.

5.8 SCALING OF INDICATORS AND SUB-INDICATORS

The economic base data used in the comparative evaluation of siting options were presented in Table 21. The data includes various quantitative measures (i.e., annual sales in dollars, employment, number of businesses, etc.) which cannot be added directly to provide an estimate of economic base impacts. To permit addition (or subtraction), the data have been converted to a scale of 0 to 100. The scale can be either positive for favourable impacts or negative for unfavourable impacts. The siting option with the largest impact is assigned a scaling value of 100 and all other siting options are scaled relative to this.

The scaling values of the data for each indicator and sub-indicator by siting option is presented on Table 23.

TABLE 23

SCALING OF INDICATORS AND SUB-INDICATORS

	Siting Options					
	Region of Niagara				Region of Halton	
	West Lincoln		Niagara Falls		Milton	
Factor/Indicator/Sub-Indicator	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Displacement of Business Activity						
Number of businesses	0	0	-86	-100	-71	-43
Number of employees	0	0	-67	-100	-42	-24
Annual sales	0	0	-67	-100	-27	-10
Property Value Impacts*	-24	-23	-36	-55	-78	-100
Business Activity Positively Affected by the Presence of OWMC Facilities						
Number of businesses	0	8	8	100	8	17
Number of employees	0	0	0	100	9	9
Annual sales	0	0	0	100	9	9
Business Activity Negatively Affected by the Presence of OWMC Facilities						
Number of businesses	-56	-25	-38	-75	-88	-100
Number of employees	-76	-10	-20	-76	-43	-100
Annual sales	-54	-8	-31	-51	-34	-100
Community and Regional Economic Base						
Number of new jobs created	75	84	94	100	78	78
Number of additional households created						
- area municipality	54	48	93	100	62	62
- regional municipality	75	84	93	100	97	97
Perceptions of community economic impact						
- number of businesses perceiving positive impacts	26	26	37	100	32	37
- number of businesses perceiving negative impacts	-95	-90	-43	-100	-95	-100

* Since the property value impacts factor has no indicators, the scaled values shown here are for the factor.

5.9 RANKING OF INDICATORS AND SUB-INDICATORS

The next step in the comparative evaluation process is the ranking of indicators and sub-indicators. The ranking of indicators and sub-indicators establishes the level of relative importance of each indicator and sub-indicator in the overall process of determining the ranking of siting options by each factor. Indicators are ranked in importance from 1 to 5, with 5 representing the highest degree of importance. Sub-indicators are also ranked in importance, but from 1 to 3, with 3 representing the highest degree of importance.

A set of criteria was established by M.M. Dillon Limited and the site selection team for ranking factors.* The same criteria has application for the ranking of indicators and sub-indicators. This criteria has been adapted and restated here for the purpose of ranking the indicators and sub-indicators of the economic base factors. These criteria include consideration of the following:

- Severity of impacts - indicators and sub-indicators having long-term economic and direct dollar impacts were ranked more highly (all impacts on employment, sales and household growth were considered to be severe in this analysis).
- Significance - significant indicators and sub-indicators were ranked more highly. Significance is determined by the relative importance of the indicator or sub-indicator to the economic base of the area or regional municipality.

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* See M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Site Selection, 1985.

TABLE 24

INDICATOR WEIGHTS AND RATIONALE

Factor	Indicator	Weight	Rationale
Displacement of Business Activity	Number of businesses	4	- Provides a direct measure of the potential impact on individual businesses - Indirect measure of the impact on economic base
	Number of employees	5	- Provides a direct measure of the potential impact on employees and economic base
	Annual sales	5	- Provides a direct measure of the potential impact on economic base - Good summary measure of economic base impact (can be used to indirectly estimate employment and business impacts)
Business Activity Positively Affected by the Presence of OWMC Facilities	Number of businesses	4	- Provides a direct measure of the potential impact on individual businesses - Indirect measure of the impact on economic base
	Number of employees	5	- Provides a direct measure of the potential impact on employees and economic base
	Annual sales	5	- Provides a direct measure of the potential impact on economic base - Good summary measure of economic base impact (can be used to indirectly estimate employment and business impacts)
Business Activity Negatively Affected by the Presence of OWMC Facilities	Number of businesses	4	- Provides a direct measure of the potential impact on individual businesses - Indirect measure of the impact on economic base
	Number of employees	5	- Provides a direct measure of the potential impact on employees and economic base
	Annual sales	5	- Provides a direct measure of the potential impact on economic base - Good summary measure of economic base impact (can be used to indirectly estimate employment and business impacts)
Community and Regional Economic Base	Number of new jobs created	5	- Provides a direct measure of the impact on economic base
	Number of additional households created	5	- Good measure of growth and economic base impacts
	Perceptions of community economic impact	3	- Short-term impact provided mitigative measures reduce negative impacts

The rankings of indicators, along with the rationale for these rankings, are shown on Table 24. The highest ranking is assigned to the employment, sales and household growth indicators, followed by a slightly lower ranking for the number of businesses affected.

The perceptions of community economic impact indicator for the community and regional economic base factor is assigned the lower ranking of 3.

The ranking of sub-indicators are shown in Table 25. Similar to the ranking of indicators, definable impacts (i.e., the number of households created) are assigned a relatively higher ranking (3) and sub-indicators which measure perceptions are assigned a relatively lower ranking (in this case 2).

TABLE 25

SUB-INDICATOR WEIGHTS AND RATIONALE

Factor	Indicator	Sub-Indicator	Weight	Rationale
Community and Regional Economic Base	Number of additional households created	New households created in area municipality	3	- Direct measure of household growth
		New households created in regional municipality	3	- Direct measure of household growth
	Perceptions of community economic impact	Number of businesses perceiving positive impacts	2	- Measures the business sectors' perception of impact of OWMC facilities on economic base
		Number of businesses perceiving negative impacts	2	- Measures the business sectors' perception of impact of OWMC facilities on economic base

The differences in the rankings assigned each indicator and sub-indicator are explained by the significance and severity of impacts which affect employment, households and business sales, versus those which measure perceived impacts and which may only have short-term effects.

5.10 INDICATOR SCORING AND AGGREGATION*

The purpose of this section is to aggregate sub-indicators and indicators to the factor level.

5.10.1 SUB-INDICATORS

The scoring and aggregation of sub-indicators is confined to one economic base factor - community and regional economic base (there are no sub-indicators for the other four factors). This is shown in Table 26.

The aggregation of the number of additional households created in both the area and regional municipalities provides a direct measure of the increase in households created by each siting option. The sub-indicators are assigned the same ranking (3) and are positive for both area and regional municipal household growth. The two sub-indicators which estimate perceptions of community economic impact are on different scales; one estimates a positive impact (number of businesses perceiving positive impacts) and the other estimates a negative impact (number of businesses perceiving negative impacts). Both are assigned a ranking of 2. When these sub-indicators are aggregated, the perceptions of community economic impact indicator becomes a composite estimate of both positive and negative economic base impacts.

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* Scoring is defined here as the assigned weight times the scaled value for any factor, indicator or sub-indicator for each siting option.

TABLE 26

AGGREGATE RANKED SUB-INDICATOR SCORES

		Siting Options					
		Region of Niagara				Region of Halton	
		West Lincoln		Niagara Falls		Milton	
Factor/Indicator/Sub-Indicator	Weight	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Community and Regional Economic Base							
Number of new jobs created		75	84	94	100	78	78
Number of additional households created							
- area municipality	3	162	144	279	300	186	186
- regional municipality	3	225	252	279	300	291	291
Aggregate Sub-Indicator Score		387	396	558	600	477	477
Indicator Scale		65	66	93	100	80	80
Perceptions of community economic impact							
- number of businesses perceiving positive impacts	2	52	52	74	200	64	74
- number of businesses perceiving negative impacts	2	-190	-180	-86	-200	-190	-200
Aggregate Sub-Indicator Score		-138	-128	-12	0	-126	-126
Indicator Scale		-100	-93	-9	0	-91	-91

TABLE 27

AGGREGATE RANKED INDICATOR SCORES

		Siting Options					
		Region of Niagara				Region of Halton	
		West Lincoln		Niagara Falls		Milton	
Factor/Indicator	Weight	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Displacement of Business Activity							
Number of businesses	4	0	0	-344	-400	-284	-172
Number of employees	5	0	0	-335	-500	-210	-120
Annual sales	5	0	0	-335	-500	-135	-50
Aggregate Ranked Indicator Scores		0	0	-1,014	-1,400	-629	-342
Factor Scale		0	0	-72	-100	-45	-24
Property Value Impacts*	n.a.	-24	-23	-36	-55	-78	-100
Business Activity Positively Affected by the Presence of OWMC Facilities							
Number of businesses	4	0	32	32	400	32	68
Number of employees	5	0	0	0	500	45	45
Annual sales	5	0	0	0	500	45	45
Aggregate Ranked Indicator Scores		0	32	32	1,400	122	158
Factor Scale		0	2	2	100	9	11
Business Activity Negatively Affected by the Presence of OWMC Facilities							
Number of businesses	4	-224	-100	-152	-300	-352	-400
Number of employees	5	-380	-50	-100	-380	-215	-500
Annual sales	5	-270	-40	-155	-255	-170	-500
Aggregate Ranked Indicator Scores		-874	-190	-407	-935	-737	-1,400
Factor Scale		-62	-14	-29	-67	-53	-100
Community and Regional Economic Base							
Number of new jobs created	5	375	420	470	500	390	390
Number of additional households created	5	325	330	465	500	400	400
Perceptions of community economic impact	3	-300	-279	-27	0	-273	-273
Aggregate Ranked Indicator Scores		400	471	908	1,000	517	517
Factor Scale		40	47	91	100	52	52

* The property value impacts factor has no indicators, therefore, the scaled values for this factor are those shown on Table 23.

5.10.2 INDICATORS

The aggregate ranked indicator scores for each factor by siting option are shown in Table 27. Similar to the methodology applied to the sub-indicators, the indicator ranking or weight is applied to the scaled data for each indicator (shown in Table 23) or to the scaled indicators derived from the scoring and ranking of sub-indicators (shown in Table 26). The ranked indicator scores are then aggregated to the factor level.

5.11 FACTOR SUITABILITY LEVELS

The purpose of this section is to transpose the aggregate ranked indicator scores for the economic base factors to a scale ranging from 0 to 5. The rating of siting options on this scale is referred to as factor suitability levels.

To transpose the aggregate ranked indicator scores by siting option (shown in Table 27) to a corresponding factor suitability level, the largest ranked indicator score for each factor (i.e., the value of -1,400 for the displacement of business activity factor under siting option LF-1E/PI-27E) is assigned a factor suitability level of -5.0. The factor suitability levels of the remaining siting options are assigned proportionate values based on their aggregate ranked indicator scores.

Factor suitability levels by siting option for each of the five economic base impact factors are shown in Table 28. The negative impacts include displacement of business activity, property value impacts and business activity negatively affected by the presence of OWMC facilities. The positive impacts include business activity positively affected by the presence of OWMC facilities and community and regional economic base.

TABLE 28

FACTOR SUITABILITY LEVELS BY SITING OPTION

	Siting Options					
	Region of Niagara				Region of Halton	
	West Lincoln		Niagara Falls		Milton	
Factor	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-11	LF-4N/ PI-13N
Displacement of Business Activity	0.0	0.0	-3.6	-5.0	-2.2	-1.2
Property Value Impacts	-1.2	-1.2	-1.8	-2.8	-3.9	-5.0
Business Activity Positively Affected by the Presence of OWMC Facilities	0.0	0.1	0.1	5.0	0.4	0.6
Business Activity Negatively Affected by the Presence of OWMC Facilities	-3.1	-0.7	-1.4	-3.3	-2.6	-5.0
Community and Regional Economic Base	2.0	2.4	4.5	5.0	2.6	2.6

Tables 29 through 34 list the factor suitability levels for each siting option together with a rationale for the calculated level.

5.12 FACTOR RANKING

In the comparative evaluation process, where siting options are evaluated across a large number of factors, it is necessary to establish rankings (or weights) for each factor, since not all factors have the same impact, risk or cost. An initial ranking of economic base factors was established by Clayton Research Associates and endorsed by the site selection team. Following data analysis and public meetings, some of the factor rankings have been revised. The old and new economic base factor rankings, together with the rationale for the rankings, are provided in Table 35.

With the exception of the displacement of business activity and property value impact factors, the ranking of the economic base factors did not change between the initial ranking and the revised

TABLE 29

FACTOR SUITABILITY LEVELS, LF-3C

Factor	Suitability Level	Rationale
Displacement of Business Activity	0.0	- There are no businesses displaced
Property Value Impacts	-1.2	- A low level ($451,000) of negative property value impacts within site vicinity
Business Activity Positively Affected by the Presence of OWMC Facilities	0.0	- There are no businesses, employees or annual sales positively affected
Business Activity Negatively Affected by the Presence of OWMC Facilities	-3.1	- The number of businesses negatively affected are moderate - Annual sales ($2,348,000) and number of employees negatively affected are moderately high
Community and Regional Economic Base	2.0	- The number of new jobs created and households generated are moderately low - Perceptions among community businesses are primarily negative on the possible effects of the facilities

TABLE 30

FACTOR SUITABILITY LEVELS, LF-9C

Factor	Suitability Level	Rationale
Displacement of Business Activity	0.0	- There are no businesses displaced
Property Value Impacts	-1.2	- A low level ($435,000) of negative property value impacts within site vicinity
Business Activity Positively Affected by the Presence of OWMC Facilities	0.1	- There are few businesses and employees positively affected - The estimated annual sales of businesses positively affected are low
Business Activity Negatively Affected by the Presence of OWMC Facilities	-0.7	- There are few businesses negatively affected - Annual sales ($355,000) and number of employees negatively affected are low
Community and Regional Economic Base	2.4	- The number of new jobs created are moderate - The number of additional households generated are moderately low - Perceptions among community businesses are primarily negative on the possible effects of the facilities.

TABLE 31

FACTOR SUITABILITY LEVELS, LF-1E

Factor	Suitability Level	Rationale
Displacement of Business Activity	-3.6	- There are a moderately high number of businesses displaced - The estimated annual sales ($1,741,000) of businesses displaced are moderately high
Property Value Impacts	-1.8	- A moderately low degree ($679,000) of negative property value impacts within site vicinity
Business Activity Positively Affected by the Presence of OWMC Facilities	0.1	- There are few businesses and employees positively affected - The estimated annual sales of businesses positively affected are low
Business Activity Negatively Affected by the Presence of OWMC Facilities	-1.4	- The number of businesses negatively affected are low - Number of employees and annual sales ($1,333,000) negatively affected are moderately low
Community and Regional Economic Base	4.5	- Number of new jobs created and households generated are moderately high - Perceptions among community businesses balanced between positive and negative on the possible effects of the facilities

TABLE 32

FACTOR SUITABILITY LEVELS, LF-1E/PI-27E

Factor	Suitability Level	Rationale
Displacement of Business Activity	-5.0	- The largest number of businesses displaced - The estimated annual sales ($2.6 million) of businesses displaced is comparatively high
Property Value Impacts	-2.8	- A moderate degree ($1,050,000) of negative property value impacts within site vicinity
Business Activity Positively Affected by the Presence of OWMC Facilities	5.0	- There are a comparatively large number of businesses and employees positively affected - The estimated annual sales ($81.9 million) of businesses positively affected are high
Business Activity Negatively Affected by the Presence of OWMC Facilities	-3.3	- The number of businesses negatively affected are moderately high - Annual sales ($2,192,000) and number of employees negatively affected are moderately high
Community and Regional Economic Base	5.0	- Number of new jobs and households created are high - Perceptions among community businesses balanced between positive and negative on the possible effects of the facilities.

TABLE 33

FACTOR SUITABILITY LEVELS, LF-4N/PI-1N

Factor	Suitability Level	Rationale
Displacement of Business Activity	-2.2	- There are a moderate number of businesses displaced - The estimated annual sales ($709,000) and number of employees displaced are moderately low
Property Value Impacts	-3.9	- There is a moderately high degree of negative property value impacts ($1,487,000) within site vicinity
Business Activity Positively Affected by the Presence of OWMC Facilities	0.4	- There are few businesses and employees positively affected - The estimated annual sales of businesses positively affected are moderately low
Business Activity Negatively Affected by the Presence of OWMC Facilities	-2.6	- The number of businesses negatively affected is comparatively high - The number of employees negatively affected are moderate - Annual sales ($1,473,000) of businesses negatively affected are moderately low
Community and Regional Economic Base	2.6	- The number of new jobs created and households generated are moderate - Perceptions among community businesses primarily negative on possible effects of the facilities

TABLE 34

FACTOR SUITABILITY LEVELS, LF-4N/PI-13N

Factor	Suitability Level	Rationale
Displacement of Business Activity	-1.2	- There are few businesses displaced - The estimated annual sales ($269,000) and number of employees displaced are low
Property Value Impacts	-5.0	- There is a high degree of negative property value impacts ($1,912,000) within the site vicinity
Business Activity Positively Affected by the Presence of OWMC Facilities	0.6	- There are few businesses and employees positively affected - The estimated annual sales of businesses positively affected are moderate
Business Activity Negatively Affected by the Presence of OWMC Facilities	-5.0	- The number of businesses negatively affected is comparatively high - The annual sales of businesses ($4,318,000) and number of employees negatively affected is comparatively high
Community and Regional Economic Base	2.6	- The number of new jobs created and households generated are moderate - Perceptions among community businesses primarily negative on the possible effects of the facilities.

ranking. The ranking of the displacement of business activity factor was lowered because appropriate compensation for any business displacement would mitigate many of the negative impacts estimated by this factor. Thus, this factor became less important in the relative ranking of factors. Property value impacts were assigned a slightly lower ranking because these impacts will likely diminish over time and there is the possibility that some of the nuisance impacts of the facilities could be mitigated.

The community and regional economic base factor has the highest ranking of all economic base factors. This factor was assigned a high ranking because it affects a wide range of other factors, as well as a wide geographical area and a large number of people. Property value impacts and business activity negatively affected by the presence of OWMC facilities were assigned a slightly lower ranking because these impacts could be partially mitigated. The lowest ranking was assigned to displacement of business activity and business activity positively affected by the presence of OWMC facilities since any displaced businesses would be compensated and any positive impacts were judged to likely be minor.

5.13 FACTOR SCORING AND AGGREGATION

The aggregated ranked indicator scores developed in Table 27 are transposed to a scale of 0 to 100, and are shown for each factor in Table 36. The factor weights from Table 35 are combined with these values for each siting option to derive a ranked factor score. These are shown on Table 37. These factors can be summed to derive an aggregate ranked factor score for each siting option.

TABLE 35

RATIONALE FOR RANKING OF FACTORS

Factor	Initial Ranking*	Revised Ranking	Rationale
Displacement of Business Activity	6	4	- Short-term impacts provided that displaced uses are relocated with appropriate compensation - Potential retention of uses on some sites
Property Value Impacts	8	7	- Significant community concern - Potential impacts diminish over time - Mitigative measures possible on nuisance impacts, thereby indirectly reducing property value impacts
Business Activity Positively Affected by the Presence of OWMC Facilities	4	4	- Impacts expected to be minor
Business Activity Negatively Affected by the Presence of OWMC Facilities	6	6	- Significant community concern - Mitigation and compensation possible - Impacts expected to be moderate
Community and Regional Economic Base	8	8	- Affects a wide range of other factors - Potentially affects a wide area and a large number of people

* The initial ranking values were on a scale of 1 to 5. These have been adjusted here to the same scale as the revised ranking (which is on a scale of 1 to 10) for comparative purposes.

TABLE 36

SCALED FACTOR (AGGREGATE RANKED INDICATOR) SCORES

Factor	Siting Options					
	Region of Niagara				Region of Halton	
	West Lincoln		Niagara Falls		Milton	
	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Displacement of Business Activity	0	0	-72	-100	-45	-24
Property Value Impacts	-24	-23	-36	-55	-78	-100
Business Activity Positively Affected by the Presence of OWMC Facilities	0	2	2	100	9	11
Business Activity Negatively Affected by the Presence of OWMC Facilities	-62	-14	-29	-67	-53	-100
Community and Regional Economic Base	40	47	91	100	52	52

TABLE 37

AGGREGATED RANKED FACTOR SCORES

		Siting Options					
		Region of Niagara				Region of Halton	
		West Lincoln		Niagara Falls		Milton	
Factor	Weight	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Displacement of Business Activity	4	0	0	-288	-400	-180	-96
Property Value Impacts	7	-168	-161	-252	-385	-546	-700
Business Activity Positively Affected by the Presence of OWMC Facilities	4	0	8	8	400	36	44
Business Activity Negatively Affected by the Presence of OWMC Facilities	6	-372	-84	-174	-402	-318	-600
Community and Regional Economic Base	8	320	376	728	800	416	416
Aggregate Ranked Factor Scores		-220	139	22	13	-592	-936

5.14 COMPARISON AND RANKING OF SITING OPTIONS

The purpose of this section is to rank the six siting options on the basis of the aggregate ranked factor scores of the economic base factor and to provide an evaluation of the rationale for this ranking. This section also reintroduces some of the qualitative considerations which have been discussed in the report and which could have an economic base impact for some siting options. In the following sensitivity analysis chapter, various considerations are evaluated to determine if the ranking of the siting options would change if certain assumptions were changed.

The ranking of the siting options for the economic base factor is determined by the aggregate ranked factor scores shown in Table 37. These scores range from very high negative values to one moderately high positive value. A negative value is derived if the overall economic base impacts for a siting option are estimated to be negative. The highest negative value would be the least preferred siting option. A positive value occurs if the overall economic base impacts are positive; the highest positive value would be the most preferred siting option.

The siting options for economic base impacts are ranked from the most preferred to the least preferred as follows:

- LF-9C, West Lincoln
- LF-1E, Niagara Falls
- LF-1E/PI-27E, Niagara Falls
- LF-3C, West Lincoln
- LF-4N/PI-1N, Milton
- LF-4N/PI-13N, Milton

Siting options LF-9C in West Lincoln and LF-1E and LF-1E/PI-27E in Niagara Falls are the only three siting options which are expected to have an overall positive impact on the economic base of their candidate municipalities.

Siting option LF-9C in West Lincoln is ranked as the most preferred siting option when all economic base factors considered in this report are ranked and aggregated. This siting option is characterized by very little economic activity which is not agriculturally based (agricultural impacts are excluded from the economic base analysis). No businesses would be displaced by the location of OWMC facilities on this siting option and there are very few businesses within the site vicinity which would be either positively or negatively affected.* Since there were very few measurable negative economic base impacts, the positive impact estimated by the community and regional economic base factor (i.e., new jobs created, employment growth and business perceptions of community economic impacts) was large enough to result in an overall positive impact and the highest ranking among the siting options.

The economic base impacts of the two West Lincoln siting options would be altered if agricultural impacts were included in the analysis. Siting option LF-3C affects two farms on-site and 37 in the site vicinity; LF-9C also affects two farms on-site, but affects fewer farms, 30 in total, in the site vicinity. There are also impacts on the agricultural economy along access roads to OWMC facilities and in the Region from facilities emissions and possible stream contamination. It is also important to note that impacts on the agricultural economy would in turn affect service related firms, i.e., farm implement dealers and feed mills.*

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* For a list of types of businesses included in the analysis see pp. 19-20.

The importance of the agriculture industry to the West Lincoln economy was noted in Chapter 3. Employment in agriculture accounts for 30.5 percent of the total employment in the Township. Due to the relatively small total population of the Township and the strong economic base reliance on agriculture, even a small impact on the agricultural industry would have an impact on the Township's economic base.

The two siting options in Niagara Falls, LF-1E and LF-1E/PI-27E, have virtually the same economic base impacts (in total). When all economic base factors are combined, both are slightly positive. Siting option LF-1E, unlike LF-9C, has measurable economic activity. There is a moderate displacement of business activity on-site and a moderate negative property value impact. These negative impacts were offset by a high positive impact estimate for the community and regional economic base factor. An important element which is excluded in the comparative evaluation of siting option LF-1E is the possible positive impacts of the facilities on business activity just outside the defined site vicinity study area (two kilometres from the centre of the site). If these businesses are included in the analysis (i.e., the Ford Motor Company glass plant, Cyanamid Inc. and B.F. Goodrich), the estimated positive economic base impact would be relatively large for LF-1E and it would become the most preferred siting option for economic base impacts by a wide margin.

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* For a discussion of the agricultural impacts of OWMC facilities, see Ecologistics Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Agriculture, 1985.

Siting option LF-1E/PI-27E, because it combines two sites, has much higher negative property value and displacement of business activity impacts than does integrated siting option LF-1E. Despite this, it is ranked very close to LF-1E due to the number of businesses within the site vicinity of PI-27E that would be positively affected by OWMC facilities (since the site vicinity of PI-27E includes the Ford Motor Company glass plant, Cyanamid Inc. and B.F. Goodrich).

Possible industrial spin-offs (forward linkages), while excluded as a factor in the comparative evaluation process, are considered to be most likely for siting options LF-1E and LF-1E/PI-27E. Any spin-off industry would have both positive and negative impacts on the economic base which would have to enter into the overall impact assessment. A discussion of possible spin-off industries is included in Appendix F.

Impacts of OWMC facilities on the tourism industry in Niagara Falls, as noted in Chapter 2 and 3, were excluded from this economic base impact analysis.* Any negative impacts on tourism employment would reduce the net number of employees and households generated by OWMC facilities. While this impact alone is unlikely to effect the ranking of siting options for economic base factors, it would likely result in the overall economic base impacts for the two Niagara Falls siting options being negative, as opposed to the positive impact derived in this economic base impact analysis.

Siting option LF-3C is similar to LF-9C in that the area economy is agriculturally based. As a result, negative impacts on property values are small, there is no displacement of business activity and the estimated positive impact on the community and regional economic base factor is moderate compared to other siting options. The major difference which separates the ranking of LF-3C from LF-9C is the inclusion of the Robert Land Military Academy under the business activity negatively affected by the presence of OWMC facilities factor. This school has a budget in excess of $1.1 million and has 42 employees and the negative impacts of OWMC facilities on this operation is sufficient to lower the ranking of this option to the fourth most preferred.

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* Tourism impacts of OWMC facilities are examined by Laventhol & Horwath. See Institute of Environment Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Social Analysis, Appendices, Volume 4, Tourism Impacts, 1985.

The overall economic base impacts of the two Milton siting options are strongly negative. Siting options LF-4N/PI-1N and LF-4N/PI-13N have large negative property value impacts (largely because two sites are required for these options) and a large negative impact on existing businesses (i.e., horse breeding and nursery orchard operations). One of the most important factors in the ranking of these siting options is the few businesses which are positively affected by the presence of OWMC facilities in Milton.

In the following sensitivity analysis chapter, a number of "what if" questions are addressed and changes in the underlying assumptions are made to determine their effect on the preceding results.

CHAPTER 6

SENSITIVITY ANALYSIS AND POTENTIAL FOR MITIGATION

6.1 PURPOSE

The analysis and findings to this point have utilized a base case set of assumptions and procedures relating to the potential economic base impacts resulting from OWMC facilities. These assumptions and procedures produce a "best estimate" result. However, it should be noted that the base case scenario was chosen so as to prevent the understating of the extent of negative impacts or the exaggeration of the extent of positive impacts. The assumptions also have not incorporated any allowance for mitigation measures which could be undertaken by OWMC to counter the more negative impacts identified in the base case analysis.

The purposes of this chapter are: first, to examine alternative key assumptions and determine the impact they would have on the ranking of siting options by the economic base factors; and second, to identify mitigative measures that could be undertaken by OWMC to reduce the negative impacts associated with the facilities.

The chapter is divided into two parts. The first part presents alternative assumptions to the key assumptions used in the base case scenario and presents estimates of the impact of substituting these alternative assumptions on the ranking of the siting options. The second part discusses the possible mitigation measures which OWMC could undertake and their impact on the ranking of the siting options.

6.2 SENSITIVITY ANALYSIS

The implications of nine alternative input assumptions on the ranking of the siting options are analyzed here:

- The facilities will have the capacity to process 150,000 tonnes of special wastes per year in the tenth year of operation.
- The negative property value impacts associated with the facilities will be based on the largest impacts encountered in the literature and there will be an out-migration of households.
- There will be no negative property value impacts in the vicinity of the siting options.
- The method of effluent management will be partial solidification rather than total solidification.
- OWMC facilities will generate 200 additional regional jobs (through the employment multiplier effect on spin-off industry) and a proportionate increase in households.
- Siting option boundaries for LF-1E and LF-3C are revised to achieve a minimum site area (i.e., a 20 year landfill life with partial solidification).
- Factor rankings are changed from the base case scenario.
- Selected indicator and sub-indicator rankings are changed from the base case scenario.
- Industrial employment and household growth changes the economic base of the municipalities from that of the base year.

6.2.1 CAPACITY OF 150,000 TONNES PER YEAR

Designing OWMC facilities for a 150,000 tonnes processing capacity in the tenth year of operation, rather than the 300,000 tonnes capacity of the base case scenario, reduces on-site employment from 217-221 jobs to 147-151 jobs. When the effect of the employment multiplier is taken into account, the total regional employment generated by the facilities with 150,000 tonnes processing capacity ranges from 215 jobs to 286 jobs under the various siting options.

TABLE 38

BASE CASE AND ALTERNATIVE ASSUMPTION ECONOMIC BASE IMPACTS

Factor, Indicator or Sub-Indicator by Siting Option	Base Case Scenario	150,000 Tonnes Scenario
Number of New Jobs Created		
LF-3C	316	215
LF-9C	356	243
LF-1E	395	270
LF-1E/PI-27E	422	286
LF-4N/PI-1N	331	224
LF-4N/PI-13N	331	224
Number of Additional Households Created - Area Municipality		
LF-3C	67	45
LF-9C	60	41
LF-1E	116	79
LF-1E/PI-27E	125	84
LF-4N/PI-1N	77	53
LF-4N/PI-13N	77	53
Number of Additional Households Created - Regional Municipality		
LF-3C	133	90
LF-9C	150	102
LF-1E	165	113
LF-1E/PI-27E	178	120
LF-4N/PI-1N	172	117
LF-4N/PI-13N	172	117

Source: Appendix Tables D-9, D-10, E-1, E-2, E-3 and E-4.

Employment changes have a direct effect on household growth. Under the 150,000 tonnes processing capacity, household growth declines by approximately one-third for all siting options.

TABLE 39

IMPLICATIONS ON RANKING OF SITING OPTIONS 150,000 TONNES SCENARIO

	Total Aggregated Ranked Factor Scores		Ranking of Siting Options	
Siting Option	Base Case Scenario	150,000 Tonnes Scenario	Base Case Scenario	150,000 Tonnes Scenario
LF-3C	-220	-220	4	4
LF-9C	139	139	1	1
LF-1E	22	22	2	2
LF-1E/PI-27E	13	13	3	3
LF-4N/PI-1N	-592	-608	5	5
LF-4N/PI-13N	-936	-952	6	6

The community and regional economic base factor is the only factor affected by the reduction in the processing capacity of the facilities. This factor is affected both by the decrease in employment and by the decrease in household growth. Since the decrease is of the same proportion for each siting option, the factor suitability levels under this scenario are very similar to the factor suitability levels of the base case scenario. Consequently, the substitution of the 150,000 tonnes capacity does not alter the ranking of the siting options for the economic base factors. Siting option LF-9C in West Lincoln remains the most preferred location from the perspective of the economic base factors, followed closely by the two Niagara Falls siting options.

6.2.2 LARGER NEGATIVE PROPERTY VALUE AND OUT-MIGRATION IMPACTS

TABLE 40

BASE CASE AND ALTERNATIVE ASSUMPTION ECONOMIC BASE IMPACTS

Factor, Indicator or Sub-Indicator by Siting Option	Base Case Scenario	Larger Negative Property Value Impact and Out-Migration Scenario
Property Value Impacts ($000)		
LF-3C	-451	-673
LF-9C	-435	-644
LF-1E	-679	-1,251
LF-1E/PI-27E	-1,050	-1,794
LF-4N/PI-1N	-1,487	-2,407
LF-4N/PI-13N	-1,912	-3,429
Number of Additional Households Created - Area Municipality		
LF-3C	67	53
LF-9C	60	52
LF-1E	116	107
LF-1E/PI-27E	125	113
LF-4N/PI-1N	77	64
LF-4N/PI-13N	77	60
Number of Additional Households Created - Regional Municipality		
LF-3C	133	119
LF-9C	150	142
LF-1E	165	156
LF-1E/PI-27E	178	166
LF-4N/PI-1N	172	159
LF-4N/PI-13N	172	155

Source: Appendix Tables C-7, C-8, E-1 and E-2.

The base case estimates of the reduced market values of properties in the site vicinity assume a reduction which would decrease with distance from the site up to 1,500 metres. For example, residential property values are assumed to decrease by 16 percent within a 500 metre radius of the boundary of the siting option, by eight percent between 500 metres and 1,000 metres and by four percent between 1,000 and 1,500 metres. Farm and commercial/industrial property values are assumed to decline in a similar manner. For the larger negative impact scenario, the estimates are based on the largest negative impacts encountered in the literature search. For example, residential property values are assumed to decline by 46 percent within 500 metres of the siting option, 23 percent from 500 to 1,000 metres and 11.5 percent from 1,000 to 1,500 metres; farm and commercial/industrial property values are again assumed to decline in a similar manner.

It was also assumed in this scenario that the households interviewed by the Institute of Environmental Research (in their portion of the "Walk and Talk Program") who indicated they would leave their community as a result of the location of OWMC facilities, would actually do so. Their numbers ranged from eight households in the site vicinity of LF-9C to 17 households in the site vicinity of LF-4N/PI-13N.*

TABLE 41

IMPLICATIONS ON FACTOR SUITABILITY LEVELS
LARGER NEGATIVE PROPERTY VALUE IMPACT AND OUT-MIGRATION SCENARIO

Factor by Siting Option	Base Case Scenario	Larger Negative Property Value Impact and Out-Migration Scenario
Property Value Impacts		
LF-3C	-1.2	-1.0
LF-9C	-1.2	-1.0
LF-1E	-1.8	-1.9
LF-1E/PI-27E	-2.8	-2.6
LF-4N/PI-1N	-3.9	-3.5
LF-4N/PI-13N	-5.0	-5.0
Community and Regional Economic Base		
LF-3C	2.0	1.9
LF-9C	2.4	2.4
LF-1E	4.5	4.6
LF-1E/PI-27E	5.0	5.0
LF-4N/PI-1N	2.6	2.5
LF-4N/PI-3N	2.6	2.4

These alternative assumptions affect two economic base factors - property value impacts and community and regional economic base. For property value impacts, the factor suitability levels for siting options LF-3C, LF-9C, LF-1E/PI-27E and LF-4N/PI-1N improve slightly.

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* See Institute of Environmental Research Inc., Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Social Analysis, 1985.

The factor suitability level for LF-1E decreases slightly (from -1.8 to -1.9) while LF-4N/PI-13N remains at -5.0. The substantial amount of residential property located near these latter siting options (residential property values are assumed to receive the highest negative impact) results in a higher absolute and relative difference between these two siting options and the other siting options. For the community and regional economic base factor, there are only marginal changes in the factor suitability levels.

TABLE 42

IMPLICATIONS ON RANKING OF SITING OPTIONS
LARGER NEGATIVE PROPERTY VALUE IMPACT AND OUT-MIGRATION SCENARIO

	Total Aggregated Ranked Factor Scores		Ranking of Siting Options	
Siting Option	Base Case Scenario	Larger Negative Property Value Impact and Out-Migration Scenario	Base Case Scenario	Larger Negative Property Value Impact and Out-Migration Scenario
LF-3C	-220	-208	4	4
LF-9C	139	167	1	1
LF-1E	22	23	2	3
LF-1E/PI-27E	13	34	3	2
LF-4N/PI-1N	-592	-552	5	5
LF-4N/PI-13N	-936	-968	6	6

The combined effects of altering the property value impact and out-migration assumptions result in a slight change in the overall ranking of siting options. Siting option LF-9C remains the most preferred siting option, however, LF-1E/PI-27E becomes the second most preferred option and LF-1E the third most preferred. The ranking of the remaining three siting options does not change. The reversal of LF-1E and LF-1E/PI-27E is the result of a higher negative property value impact for siting option LF-1E under the alternative scenario. It should be noted that the difference in the economic base impacts of these two siting options is minimal and is subject to change with only minor changes in key assumptions.

6.2.3 NO NEGATIVE PROPERTY VALUE IMPACTS

Under this assumption, OWMC would initiate mitigative measures to counter any negative impacts of the facilities on surrounding properties. This could include the purchase of adjacent properties or some form of compensation for properties not purchased. The former approach was used by Ontario Hydro in Bruce County.*

Should OWMC initiate a purchasing program whereby properties in the site vicinity would be purchased at market value prices if the owner desired to sell, this could fully counter any negative impacts of the facilities on property values in the site vicinity and thus remove this factor from consideration in the site selection process.

TABLE 43

IMPLICATIONS ON RANKING OF SITING OPTIONS
NO NEGATIVE PROPERTY VALUE IMPACT SCENARIO

	Total Aggregated Ranked Factor Scores		Ranking of Siting Options	
Siting Option	Base Case Scenario	No Negative Property Value Impact Scenario	Base Case Scenario	No Negative Property Value Impact Scenario
LF-3C	-220	-52	4	5
LF-9C	139	300	1	2
LF-1E	22	274	2	3
LF-1E/PI-27E	13	398	3	1
LF-4N/PI-1N	-592	-46	5	4
LF-4N/PI-13N	-936	-236	6	6

The ranking of the siting options for the economic base factors change considerably when property value impacts are removed as an impact consideration. Siting option LF-1E/PI-27E becomes the most preferred and siting option LF-9C becomes the second most preferred. Siting option LF-1E drops from the second most preferred to the third most preferred. The negative economic base impacts of the remaining three siting options are much lower when property value impacts is removed as an impact consideration.

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* Ontario Hydro responded to fears that the possibility of noxious emissions from a new heavy water plant would devalue property in the vicinity by instituting a property acquisition policy. This policy guaranteed the market value of property within the controlled development area of the plant. In a nine year period, from 1974 to 1983, Ontario Hydro purchased 42 residential and farm properties under this program within a two to five mile area of the plant (approximately five percent of the residential properties and one percent of the farm properties that were eligible). By 1983, approximately three-quarters of the properties had been resold, at a discount, to persons willing to accept the risk and inconvenience of living near a heavy water plant.

6.2.4 PARTIAL SOLIDIFICATION WITH EVAPORATION

One alternative option to the total solidification scenario for the disposal of treated effluent is partial solidification with evaporation, where treated effluent from the physical/chemical treatment plant is evaporated and discharged to the atmosphere while residues are solidified prior to disposal in the engineered landfill.

Under the partial solidification with evaporation scenario, larger auxiliary boilers and a separate stack of 45 metres height will be required. The plume from the evaporator stack will be visible, with the degree of visibility dependent upon weather conditions. Engineering features can be added to alleviate the visibility problems, if necessary.

The expected economic base impacts of the facilities utilizing the partial solidification with evaporation process are considered to be similar to the impacts presented in section 6.2.2 (the larger negative property value and out-migration impact scenario). Both conditions are assumed to occur as a result of the use of the partial soldification with evaporation process. As discussed in section 6.2.2, this alters the ranking of siting options slightly. Siting option LF-9C still remains the most preferred, however, LF-1E/PI-27E becomes the second most preferred and LF-1E the third most preferred. The ranking of the remaining siting options do not change from the base case scenario.

6.2.5 INDUSTRIAL SPIN-OFF EMPLOYMENT

The assumption was made in the base case analysis (and supported in Appendix F) that there will be no spin-off industries which will locate near the siting options due to the availability of OWMC facilities waste products or services.

TABLE 44

BASE CASE AND ALTERNATIVE ASSUMPTION ECONOMIC BASE IMPACTS

Factor, Indicator or Sub-Indicator by Siting Option	Base Case Scenario	Industrial Spin-Off Scenario
Number of New Jobs Created		
LF-3C	316	658
LF-9C	356	698
LF-1E	395	737
LF-1E/PI-27E	422	764
LF-4N/PI-1N	331	665
LF-4N/PI-13N	331	665
Number of Additional Households Created - Area Municipality		
LF-3C	67	139
LF-9C	60	118
LF-1E	116	211
LF-1E/PI-27E	125	226
LF-4N/PI-1N	77	155
LF-4N/PI-13N	77	155
Number of Additional Households Created - Regional Municipality		
LF-3C	133	276
LF-9C	150	294
LF-1E	165	301
LF-1E/PI-27E	178	322
LF-4N/PI-1N	172	346
LF-4N/PI-13N	172	346

Source: Appendix Tables D-3 and E-1.

Under a scenario where spin-off industry generates regional employment of 200 jobs (through the employment multiplier), the absolute estimate of economic base impacts would change, but the relative difference in impact among the siting options would remain the same. The increase in direct, indirect and induced employment from spin-off industry will result in a corresponding increase in household growth. These impacts will affect the factor suitability levels of the community and regional economic base factor, resulting in a closer grouping of siting options, but will not change the overall ranking of the siting options. Without determining the specific characteristics of any spin-off industry, it is difficult to predict the extent of econo-

TABLE 45

IMPLICATIONS ON RANKING OF SITING OPTIONS INDUSTRIAL SPIN-OFF SCENARIO

	Total Aggregated Ranked Factor Scores		Ranking of Siting Options	
Siting Option	Base Case Scenario	Industrial Spin-Off Scenario	Base Case Scenario	Industrial Spin-Off Scenario
LF-3C	-220	-132	4	4
LF-9C	139	187	1	1
LF-1E	22	30	2	2
LF-1E/PI-27E	13	13	3	3
LF-4N/PI-1N	-592	-488	5	5
LF-4N/PI-13N	-936	-832	6	6

mic base impacts. However, since the ranking of the siting options for the community and regional economic base factor does not change, the overall ranking of the siting options does not change.

As discussed in Appendix F, only the two Niagara Falls siting options were judged to have any potential to attract spin-off industries due largely to existing constraints on municipal sewer and water facilities and the lack of industrial lands in the vicinity of the other siting options.

6.2.6 REVISED SITE BOUNDARIES

Under this alternative scenario, siting option boundaries for two sites are altered to achieve a minimum site area. Integrated option LF-1E is reduced in total size by approximately 62 hectares and integrated option LF-3C is reduced in total size by approximately 91 hectares.

TABLE 46

BASE CASE AND ALTERNATIVE ASSUMPTION ECONOMIC BASE IMPACTS

Factor by Siting Option	Base Case Scenario	Boundary Revisions Scenario
Property Value Impacts ($000)		
LF-3C	-451	-395
LF-9C	-435	-435
LF-1E	-679	-650
LF-1E/PI-27E	-1,050	-1,050
LF-4N/PI-1N	-1,487	-1,487
LF-4N/PI-13N	-1,912	-1,912

Source: Appendix Table C-7.

The reduction in the size of these two siting options does not produce any significant changes from the base case scenario. The only factor affected is property value impacts. The negative property value impacts in the site vicinity of LF-3C decline from an estimated $451,000 to $395,000 and decline from an estimated $679,000 to $650,000 in the site vicinity of LF-1E. The factor suitability levels decline marginally for LF-1E and LF-3C compared to the base case scenario. All other siting options are not affected.

TABLE 47

IMPLICATIONS ON RANKING OF SITING OPTIONS
LF-1E AND LF-3C BOUNDARY REVISION SCENARIO

Siting Option	Total Aggregated Ranked Factor Scores: Base Case Scenario	Total Aggregated Ranked Factor Scores: Boundary Revision Scenario	Ranking of Siting Options: Base Case Scenario	Ranking of Siting Options: Boundary Revision Scenario
LF-3C	-220	-199	4	4
LF-9C	139	139	1	1
LF-1E	22	36	2	2
LF-1E/PI-27E	13	13	3	3
LF-4N/PI-1N	-592	-592	5	5
LF-4N/PI-13N	-936	-936	6	6

LF-9C in West Lincoln remains the preferred siting option with LF-1E and LF-1E/PI-27E second and third, respectively. The effect of the boundary change to LF-1E increases the relative difference in impact between LF-1E and LF-1E/PI-27E, however, this difference still remains small.

6.2.7 ALTERNATIVE FACTOR RANKINGS

TABLE 48

BASE CASE AND ALTERNATIVE ASSUMPTION
ALTERNATIVE FACTOR RANKINGS

Factor	Base Case Scenario	Alternative Factor Ranking
Displacement of Business Activity	4	3
Property Value Impacts	7	5
Business Activity Positively Affected by the Presence of OWMC Facilities	4	6
Business Activity Negatively Affected by the Presence of OWMC Facilities	6	6
Community and Regional Economic Base	8	8

The alternative factor rankings (weights) decrease the importance of negative economic base impacts and increases the importance of one of the positive impacts. The impact of the displacement of on-site business activity is assumed to be less severe in this scenario due to the institution of an adequate compensation package. Similarly, the impacts on property values in the site vicinity are judged to be less severe. The ranking of the business activity positively affected by the presence of OWMC facilities factor is assigned the same weight as business activity negatively affected factor, increasing in importance to a ranking of 6 in this scenario.

TABLE 49

IMPLICATIONS ON RANKING OF SITING OPTIONS
ALTERNATIVE FACTOR RANKING SCENARIO

	Total Aggregated Ranked Factor Scores		Ranking of Siting Options	
Siting Option	Base Case Scenario	Alternative Factor Ranking	Base Case Scenario	Alternative Factor Ranking
LF-3C	-220	-172	4	4
LF-9C	139	189	1	2
LF-1E	22	170	2	3
LF-1E/PI-27E	13	423	3	1
LF-4N/PI-1N	-592	-481	5	5
LF-4N/PI-13N	-936	-690	6	6

Table 49 presents the total aggregated ranked factor scores and the ranking of siting options for the base case scenario and the alternative factor ranking scenario. Positive economic base impacts are enhanced under the alternative factor ranking, although three siting options still have overall negative economic base impacts. The overall ranking of the siting options is similar to that of the sensitivity test in section 6.2.3 - the no negative property value impacts scenario. Siting option LF-1E/PI-27E becomes the most preferred option and LF-9C the second most preferred. Siting option LF-1E declines from the second most preferred to the third.

6.2.8 ALTERNATIVE INDICATOR AND SUB-INDICATOR RANKINGS

The assumptions and methodologies of the base case scenario are further evaluated by utilizing alternative indicator and sub-indicator rankings (weights). These alternative rankings are shown on Table 50.

The rankings assigned to indicators and sub-indicators which measure perceived impacts were decreased under this alternative scenario, as were indicators where direct economic base impacts

TABLE 50

BASE CASE AND ALTERNATIVE ASSUMPTION ALTERNATIVE INDICATOR AND SUB-INDICATOR RANKINGS

Factor/Indicator/Sub-Indicator	Base Case Scenario	Alternative Indicator and Sub-Indicator Ranking
Displacement of Business Activity		
Number of businesses	4	3
Number of employees	5	5
Annual sales	5	5
Business Activity Positively Affected by the Presence of OWMC Facilities		
Number of businesses	4	2
Number of employees	5	4
Annual sales	5	4
Business Activity Negatively Affected by the Presence of OWMC Facilities		
Number of businesses	4	2
Number of employees	5	4
Annual sales	5	4
Community and Regional Economic Base		
Number of new jobs created	5	5
Number of additional households	5	5
Perceptions of community economic impact	3	2
- number of businesses perceiving positive impacts	2	1
- number of businesses perceiving negative impacts	2	1

were not being estimated (i.e., number of business displaced). This lowered the ranking of all indicators for business activity either positively or negatively affected by the presence of OWMC facilities and lowered the ranking of the perceptions of community economic impact indicator for the community and regional economic base factor.

TABLE 51

IMPLICATIONS ON RANKING OF SITING OPTIONS
ALTERNATIVE INDICATOR AND SUB-INDICATOR RANKING SCENARIO

	Total Aggregated Ranked Factor Scores		Ranking of Siting Options	
Siting Option	Base Case Scenario	Alternative Indicator and Sub-Indicator Ranking	Base Case Scenario	Alternative Indicator and Sub-Indicator Ranking
LF-3C	-220	-146	4	4
LF-9C	139	223	1	1
LF-1E	22	40	2	2
LF-1E/PI-27E	13	19	3	3
LF-4N/PI-1N	-592	-482	5	5
LF-4N/PI-13N	-936	-860	6	6

The changes to the indicator and sub-indicator rankings (weights) do not alter the ranking of the siting options from the base case scenario. LF-9C remains the preferred siting option with LF-1E and LF-1E/PI-27E remaining the second and third most preferred siting options, respectively. However, the change in indicator and sub-indicator ranking de-emphasizes the overall negative impacts of OWMC facilities.

6.2.9 A FUTURE SCENARIO

It is assumed in the base case scenario that OWMC facilities were built and operational in 1984. However, OWMC facilities may in fact not be operational until the early 1990s, six to ten years after the year for which the economic base impact analysis was undertaken. In order to examine the implications of this lag, a brief analysis of future trends was undertaken to identify any anticipated changes in the economic base of the candidate municipalities that would affect the ranking of siting options.

Area municipalities

- West Lincoln is a stable agricultural community. It is expected to experience slow population growth over the next decade without any dramatic changes in its economic structure. The limited industrial growth West Lincoln may attract over the next decade is expected to locate in the Smithville industrial park.

- The Niagara Falls economy is characterized by strong manufacturing and tourism sectors. Based on recent trends, population and industrial growth is expected to be modest over the next decade.

- Milton's growth will be constrained until more land area can be serviced by expanded sewage treatment capacities.

  The population expansion of Milton (as a dormitory community of the Toronto and Hamilton areas) appears to be slowing and will continue to do so until expanded sewer and water facilities permit the development of the Shipp Corporation lands (with a potential population of 15,000 people). While servicing capacity has been reserved for some specific types of industry near Highway 401, recent industrial growth trends in Milton suggest that future industrial employment growth will be modest.

Regional municipalities

- The Region of Halton, with its industrial centres of Oakville and Burlington, will continue to experience modest growth over the next decade.

  Employment in Halton is forecast to increase by 8,400 jobs between 1984 and 1992, representing a ten percent increase from the 1984 employment base of 83,600 jobs. The industrial structure is expected to shift towards the service sector and away from manufacturing over this period. Most of this industrial growth is expected to occur in Burlington and Oakville.*

- The Region of Niagara is more heavily dependent on older, more establshed industries than is the Region of Halton. Recent years have been characterized by slow industrial growth and relatively high levels of unemployment. This is expected to continue in Niagara over the next decade.

The above trends suggest that the population and industrial composition of the candidate area and regional municipalities will be quite similar to that reflected in the 1984 base data. Thus, if the economic base impact analysis undertaken in this report were to be conducted in any year during the next decade, the rankings of the siting options would not be significantly different. The implications of these future changes (or lack of them) for the economic base impact factors are discussed below.

Displacement of business activity

With slow growth anticipated in the three area municipalities, no significant new activities are expected to locate on the siting options in the near future. The only site which has possibilities for industrial and commercial growth is site PI-27E, which is designated industrial, but lacks full municipal services. Only three hectares of industrial land have been developed in the general vicinity of this site in the last eight years and further industrial growth on PI-27E without full municipal services being extended to the site is considered unlikely over the next decade. With full municipal services, the possibility of development occurring on this site would increase.

---

* Peter Barnard Associates, Halton Region Rural Industrial Land Needs Study, 1983.

There is also the possibility that new agri- and home-businesses may locate on the siting options in the future, but their economic base impacts are not expected to be large.

Property value impacts

To the extent that future urbanization and trends in urban and semi-urban land values continue as in the recent past, property values are expected to increase relatively faster in Milton than in Niagara Falls, and relatively faster in Niagara Falls than in rural West Lincoln. This consideration would further accentuate current differences in the property value impacts factor, all other things being equal. Thus, future property value impact analyses would likely derive greater relative facilities impacts in Milton and Niagara Falls compared to West Lincoln, which would increase the preference of the West Lincoln siting options in the overall comparative evaluation of siting options.

Business activity positively affected by the presence of OWMC facilities

To the extent that new industries may be attracted to site PI-27E due to their compatibility with the large industries in the vicinity, a future analysis of business activity positively affected by the presence of OWMC facilities would potentially rank siting option LF-1E/PI-27E relatively higher in the comparative evaluation of siting options.

Business activity negatively affected by the presence of OWMC facilities

With economic base growth expected to be slow over the next decade, it is not anticipated that a significant number of new business operations would locate in the vicinity of any siting option. The ranking of the siting options for this factor should therefore not change over this period.

Community and regional economic base

Future changes in employment composition and population growth are not expected to be large enough to significantly alter the employment multipliers (calculated in Appendix D) or the commuting patterns of employees in the candidate municipalities. Thus, the estimation of the employment and household impacts of OWMC facilities are not expected to change over the next decade. Changes in the perceptions of local business operators regarding the impact of OWMC facilities on the community economy are difficult to predict. However, any change that could occur in this indicator is not considered to be significant enough to change the overall ranking of the siting options for economic base impacts.

Taking into consideration all potential changes which may occur in the economic base of the candidate municipalities over the next decade, it is expected that the impact of any such changes would only slightly improve the relative position of siting option LF-1E/PI-27E, but would not be significant enough to alter the rankings of the siting options from the rankings presented in the base case scenario.

6.3 POTENTIAL FOR MITIGATION

The economic base impact analysis has identified several negative impacts of OWMC facilities on the economic base of candidate municipalities. First, there are the negative impacts from displacement of on-site business activity. Second, there are negative impacts on property values in the site vicinity. And third, there are identified perceptions that some businesses in the site vicinity would be negatively impacted by OWMC facilities, as would the economic base of the community.

The negative impacts of displacement of on-site business activity and negative property value impacts in the site vicinity can be mitigated by a compensation program undertaken by OWMC. OWMC has indicated that all on-site business activities which are displaced will be fully compensated. For properties in the site vicinity, a compensation program similar to that outlined in section 6.2.3 would fully offset the negative impact of OWMC facilities on property values in the site vicinity. This program would be based on a purchase arrangement between property owners in the site vicinity and OWMC, where OWMC would purchase properties which were offered to the Corporation at an agreed market price. OWMC could in turn sell the properties on the open market at a reduced price to persons willing to accept the risk and inconvenience of living near such facilities.

Any negative impact of OWMC facilities on business activity in the site vicinity and on the community economic base in general can be best mitigated through the safe and efficient operation of the facilities, which over time, could dispell any initial fears of negative impacts.

6.4 CONCLUSION

The use of alternative assumptions from those utilized in the base case scenario alters the ranking of the siting options. The ranking of siting options under the base case and all alternative scenarios is shown in Table 52.

Under the base case scenario, LF-9C is the preferred siting option for economic base impact factors. This ranking changes to the second most preferred siting option when no negative property value impacts are assumed and when less importance is assigned to factors which estimate negative impacts (on the assumption that mitigative measures are undertaken). Under both scenarios, siting option LF-1E/PI-27E becomes the most preferred. The ranking of certain other siting options also changes under these alternative scenarios and these changes are also outlined on Table 52.

The ranking of the siting options for economic base impact factors is sensitive to mitigative measures undertaken by OWMC to remove the negative property value impacts of the facilities in their site vicinity. Under this scenario, siting option LF-1E/PI-27E becomes the most preferred and LF-9C the second most preferred. The overall economic base impact for both siting options is estimated to remain positive, along with LF-1E, under all alternative scenarios.

TABLE 52

SITING OPTION RANKINGS
BASE CASE AND ALTERNATIVE SCENARIOS

	Siting Options					
	LF-3C	LF-9C	LF-1E	LF-1E/ PI-27E	LF-4N/ PI-1N	LF-4N/ PI-13N
Base Case Scenario	4	1	2	3	5	6
150,000 Tonnes Scenario	4	1	2	3	5	6
Larger Negative Property Value Impact and Out-Migration Scenario	4	1	3	2	5	6
No Negative Property Value Impact Scenario	5	2	3	1	4	6
Partial Solidification With Evaporation Scenario	4	1	3	2	5	6
Industrial Spin-Off Scenario	4	1	2	3	5	6
Boundary Revision Scenario	4	1	2	3	5	6
Alternative Factor Ranking Scenario	4	2	3	1	5	6
Alternative Indicator and Sub-Indicator Ranking Scenario	4	1	2	3	5	6

Source: Tables 39, 42, 43, 45, 47, 49 and 51.

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APPENDICES

TABLE OF CONTENTS

Page

APPENDIX A: FACTOR SHEETS A-1

APPENDIX B: DESCRIPTION OF BUSINESS SURVEY B-1

APPENDIX C: DESCRIPTION OF PROPERTY VALUE IMPACT ESTIMATES C-1

APPENDIX D: DESCRIPTION OF EMPLOYMENT IMPACT ESTIMATES ... D-1

APPENDIX E: DESCRIPTION OF HOUSEHOLD IMPACT ESTIMATES E-1

APPENDIX F: DESCRIPTION OF INDUSTRIAL IMPACT ANALYSIS F-1

APPENDIX G: CONTACTS G-1

APPENDIX A
FACTOR SHEETS

TABLE OF CONTENTS

Page

Displacement of Business Activity A-1

Property Value Impacts A-7

Business Activity Positively Affected by the Presence of OWMC Facilities A-10

Business Activity Negatively Affected by the Presence of OWMC Facilities A-16

Community and Regional Economic Base A-22

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Displacement of Business Activity

FACILITY COMPONENTS AFFECTED:
All facilities.

FACTOR APPLIED FOR FOLLOWING OPTIONS:
Comparison of siting options.

DEFINITION OF FACTOR:
This factor relates to the non-farm business operations that would be displaced from each OWMC siting option.

RATIONALE/SIGNIFICANCE:
This factor is related to the objective of minimizing the impact of OWMC facilities on the economic environment.

The factor is important for three reasons:

- It describes a change in economic activity;
- It indicates the degree of disruption that may be caused at each site; and
- It has ramifications for community life in general.

SOURCES OF INFORMATION:
Information on business characteristics was gathered from a survey of businesses conducted by Clayton Research Associates during the summer and fall of 1984. The businesses were identified from assessment rolls, site visits, air photos, maps and by other members of the site selection team.

INPUTS FROM OTHER CONSULTANTS:
Ecologistics Limited provided a list of agri-businesses they were not studying in their analysis. The inclusion of these agri-businesses ensured a complete accounting of economic activity. The In-

FACTOR GROUPING: Businesses	**FACTOR:** Displacement of Business Activity

stitute of Environmental Research provided a list of home-businesses identified during the "Walk and Talk Program".

INTERPRETATION/METHODOLOGY:
The site area boundaries were mapped by Ecologistics Limited.

The locations of non-farm businesses were verified by site visits. When the owner or appropriate senior official of the business refused to supply employment or sales information during the business survey, this information was estimated by taking into account the characteristics of similar businesses in the vicinity (this procedure is described in Appendix B).

A confidential data sheet was compiled on each business. These data sheets contain information obtained through the business survey, the estimation procedures applied (if appropriate), site characteristics and photographs.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- The survey information provided by Ecologistics Limited and the Institute of Environmental Research on agri- and home-businesses, respectively, may not have been complete. Any activities missed would probably not represent a significant employment or sales potential (otherwise they would have been visible during the site inspections).

- Any survey data will have biases. The size and nature of the businesses were checked visually to establish that the employment and sales figures, and estimates, appeared reasonable.

- The data from the survey relates to the time period when the survey was undertaken.

- The estimation procedure for sales and employment levels may have introduced slight and unavoidable inaccuracies.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Displacement of Business Activity

INDICATOR:
(1) Number of Businesses

DEFINITION: This indicator is a numerical count of all businesses located on the siting options. The businesses include commercial and industrial operations, home-businesses and agri-businesses. The larger the number of these businesses, the greater the degree of potential displacement.

RATIONALE/SIGNIFICANCE:
The number of businesses provides an indication of the breadth of disruption - generally, the degree of displacement would likely be greater if a specified level of economic activity was being undertaken by several smaller firms rather than a single large firm.

SOURCES OF INFORMATION:
- Field survey;
- Assessment rolls;
- Other site selection team surveys;
- Air photographs; and
- Maps.

INPUTS FROM OTHER CONSULTANTS:
- Agri-business list obtained from Ecologistics Limited; and
- Home-business list obtained from the Institute of Environmental Research.

STUDY AREA:
Site.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Displacement of Business Activity

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- A complete coverage of agri- and home-businesses may not have been attained in the Ecologistics Limited and Institute of Environmental Research surveys.

INDICATOR:
(2) Number of Employees

DEFINITION: This indicator counts the number of employees (both full- and part-time) working at the identified businesses.

RATIONALE/SIGNIFICANCE:
The number of employees indicates the actual amount of economic activity being displaced and recognizes differences in labour intensity among firms.

SOURCES OF INFORMATION:
The number of full-time and part-time employees was collected in the business survey. Non-responses were estimated with reference to similar businesses in the site vicinity (see Appendix B for an explanation of the estimation procedures).

INPUTS FROM OTHER CONSULTANTS:
None.

STUDY AREA:
Site.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- The procedure utilized to estimate employment may have introduced slight and unavoidable inaccuracies. These inaccuracies

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Displacement of Business Activity

were minimized by visually inspecting the businesses for which estimates were made.

- Part-time employment was converted to a total employment figure utilizing a ratio based on the average hours worked by full- and part-time employees in Canada.

INDICATOR:
(3) Annual Sales

DEFINITION: This indicator measures the total business sales in the preceding financial year.

RATIONALE/SIGNIFICANCE:
Total annual sales indicates the actual amount of economic activity that is displaced and recognizes differences in sales to labour input relationships among firms.

SOURCES OF INFORMATION:
Total annual sales were collected in the business survey. Non-responses were estimated with reference to similar businesses in the site vicinity (see Appendix B for an explanation of the estimation procedures).

INPUTS FROM OTHER CONSULTANTS:
None.

STUDY AREA:
Site.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Displacement of Business Activity

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- The estimation procedure for total annual sales may have introduced slight and unavoidable inaccuracies. These inaccuracies were minimized by visually inspecting the businesses for which estimates were made.

- Since financial years vary from one company to the next, a consistent time period would not have been obtained.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: CLAYTON RESEARCH ASSOCIATES LIMITED

FACTOR GROUPING: Businesses	**FACTOR:** Property Value Impacts

FACILITY COMPONENTS AFFECTED:
All facilities.

FACTOR APPLIED FOR FOLLOWING OPTIONS:
Comparison of siting options.

DEFINITION OF FACTOR:
This factor estimates the total negative property value impact that may occur around each siting option.

RATIONALE/SIGNIFICANCE:
This factor is related to the objective of minimizing the impact of OWMC facilities on the economic environment.

The factor is important for three reasons:

- It describes a change in economic values;
- It indicates the degree of economic disruption that may be caused around each siting option; and
- It has ramifications for community life in general since the ownership of property is the central element of many persons' net worth.

SOURCES OF INFORMATION:

- Maps of the site vicinity from Ecologistics Limited;
- Assessed value of properties in the site vicinity from municipal assessment rolls;
- Ratio of market to assessed value by category of property from the Ministry of Revenue; and
- Literature review of property value impacts in similar situations (see Appendix C).

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Property Value Impacts

INPUTS FROM OTHER CONSULTANTS:
Ecologistics Limited provided: (1) 1:10,000 base maps of the site vicinity areas around the siting options with property boundaries and assessment roll numbers marked on; and (2) an inventory of assessed properties with the name and address of the property owner.

INTERPRETATION/METHODOLOGY:
The total market value of property was estimated from its assessed value for the site vicinities of all siting options. Estimates of property value impacts were derived from a literature review of property value impacts around similar facilities and then applied to this estimate of market value. The result was an estimate of the total property value impact in the vicinity of OWMC facilities.

The key to estimating market value in the vicinity of the siting options was the ratio of assessed to market value that the Ministry of Revenue calculates annually for each municipality.

Similar facilities studied in the literature review included the documented property value impacts around municipal sanitary landfill sites, nuclear power stations, noxious industries and noise emitting facilities such as airports, roads and railways (see Appendix C).

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- Unlike other economic base factors, no indicators are required in this analysis: the impact findings are summarized in a single dollar figure for the site vicinity of each siting option.

- The methodology is based on a number of significant assumptions. These assumptions include: the market value of property bears a direct relationship to its assessed value; the property value impacts around OWMC facilities will be similar in magnitude to those documented in the literature; and the median and upper

FACTOR GROUPING: Businesses	**FACTOR:** Property Value Impacts

value of all property value impacts encountered in the literature will denote the possible range of impacts around the facilities. Other relevant assumptions are listed on pages C-20 to C-22 of Appendix C.

- A number of methodological issues are raised by the property value impact literature. They include: impacts are generally studied after the fact, while the aim of Phase 4A of the site selection process is to project the impacts in advance; impacts are generally studied from an imperfect data base; a direct causal link between a potentially objectionable facility and property value impacts is difficult to establish; and circumstances can vary between impact situations. These issues are also reviewed in Appendix C.

- Since the majority of the impacts encountered in the literature occurred within 1,500 metres of the source of identified interference, a 1,500 metre zone around each siting option was accepted as an appropriate limit for study. As impacts tend to decrease with distance from the source of interference, but not in a totally consistent manner, it was assumed that the impacts applied to the 500 metre zone would halve for the 501 to 1,000 metre zone and halve again for the 1,001 to 1,500 metre zone.

- The area within a 1,500 metre radius of a large siting option (such as LF-4N/PI-13N) is considerably larger than that within a 1,500 metre radius of a small siting option (such as LF-9C). This situation should accurately reflect the possible land value impacts that may occur around a partially integrated siting option compared to an integrated siting option.

STUDY AREA:
Site Vicinity.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING:
Businesses

FACTOR:
Business Activity
Positively Affected by the
Presence of OWMC Facilities

FACILITY COMPONENTS AFFECTED:
All facilities.

FACTOR APPLIED FOR FOLLOWING OPTIONS:
Comparison of siting options.

DEFINITION OF FACTOR:
This factor relates to non-farm business operations in the site vicinity of the siting options that could be positively affected by the presence of OWMC facilities.

RATIONALE/SIGNIFICANCE:
This factor is related to the objective of minimizing the impact of OWMC facilities on the economic environment.

The factor inventories all businesses in the site vicinity that might experience increased revenues (e.g., a restaurant or gas station) or firms that might experience lower waste disposal costs due to their proximity to OWMC facilities.

The factor is important for three reasons:

- It describes a positive change in economic activity;
- It indicates the nature of the positive impacts that may be anticipated around each siting option (it does not measure the extent to which these businesses may be affected, however); and
- It has ramifications for community life in general.

SOURCES OF INFORMATION:
Information on business characteristics was gathered from a survey of businesses conducted by Clayton Research Associates during the summer and fall of 1984. The businesses were identified from

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Positively Affected by the Presence of OWMC Facilities

municipal assessment rolls, site visits, air photos, maps and by other members of the site selection team.

INPUTS FROM OTHER CONSULTANTS:
Ecologistics Limited provided a list of agri-businesses they were not studying in their analysis. The inclusion of these agri-businesses ensured a complete accounting of economic activity. The Institute of Environmental Research provided a list of home-businesses that were identified during the "Walk and Talk Program".

INTERPRETATION/METHODOLOGY:
The site vicinity boundaries were generally two kilometres from the centre of the candidate site. If there was a business activity located outside the boundary, but close to it, the boundary was extended to include the activity.

The locations of the non-farm businesses were verified by site visits. When the owner or appropriate senior official of the business refused to supply employment and sales information, or when they refused to provide an opinion on the impact of OWMC facilities, this information was estimated by taking into account the characteristics of similar businesses in the site vicinity of the candidate sites (this procedure is described in Appendix B).

The reasons stated by the respondent for the positive effects of OWMC facilities on their businesses were verified against: (1) known characteristics of OWMC facilities; (2) the business location; and (3) its operational characteristics. On a few occasions, perceived positive effects were downgraded by Clayton Research Associates to "no effect" (none were changed to "negative effect", however). This procedure is described in Appendix B.

A confidential data sheet was compiled on each business. These data sheets contain information obtained through the business sur-

LEAD CONSULTANT: CLAYTON RESEARCH ASSOCIATES LIMITED

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Positively Affected by the Presence of OWMC Facilities

vey, the estimation procedures applied (if appropriate), site characteristics and photographs.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- The survey information provided by Ecologistics Limited and the Institute of Environmental Research on agri- and home-businesses respectively, may not have been complete. Any activities missed would probably not represent a significant employment or sales potential (otherwise they would have been visible during the site inspections).
- Any survey data will have biases. The size and the nature of the businesses were checked visually to establish that the employment and sales figures, and estimates, appeared reasonable.
- The data from the survey relates to the time period when the survey was undertaken.
- The estimation procedure for sales and employment levels, and where necessary, for possible positive impacts, may have introduced slight and unavoidable inaccuracies.
- Whereas it was theoretically possible for a business to be both positively and negatively impacted at the same time, no business responded in this manner during the business survey.

INDICATOR:
(1) Number of Businesses

DEFINITION: This indicator is a numerical count of all businesses located in the site vicinity of the siting options which are positively impacted by OWMC facilities. These businesses include commercial and industrial operations, home-businesses and agri-businesses. The larger the number of these businesses, the greater the potential for positive impact.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Positively Affected by the Presence of OWMC Facilities

RATIONALE/SIGNIFICANCE:
The number of businesses provides an indication of the breadth of positive impacts - generally, the positive impacts would likely be greater if a specified level of economic activity was being undertaken by several smaller firms rather than a single large firm.

SOURCES OF INFORMATION:
- Field survey;
- Assessment rolls;
- Other site selection team surveys;
- Air photographs; and
- Maps.

INPUTS FROM OTHER CONSULTANTS:
- Agri-business list obtained from Ecologistics Limited; and
- Home-business list obtained from the Institute of Environmental Research.

STUDY AREA:
Site Vicinity.

COMMENTS/ASSUMPTIONS/LIMITATIONS:
- A complete coverage of agri- and home-businesses may not have been attained in the Ecologistics Limited and Institute of Environmental Research surveys.

INDICATOR:
(2) Number of Employees

DEFINITION: This indicator is a count of the number of employees (both full-time and part-time) working at the businesses identified as being positively impacted by OWMC facilities.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: CLAYTON RESEARCH ASSOCIATES LIMITED

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Positively Affected by the Presence of OWMC Facilities

RATIONALE/SIGNIFICANCE:
The number of employees indicates the actual amount of economic activity being positively impacted and recognizes differences in labour intensity among firms.

SOURCES OF INFORMATION:
The number of full-time and part-time employees was collected in the business survey. Non-responses were estimated with reference to similar businesses in the site vicinity (see Appendix B for an explanation of the estimation procedures).

INPUTS FROM OTHER CONSULTANTS:
None.

STUDY AREA:
Site Vicinity.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

° The procedures utilized to estimate employment may have introduced slight and unavoidable inaccuracies. These inaccuracies were minimized by visually inspecting the businesses for which estimates were made.

° Part-time employment was converted to a total employment figure utilizing a ratio based on the average hours worked by full- and part-time employees in Canada.

INDICATOR:
(3) Annual Sales

DEFINITION: This indicator measures the total sales of businesses identified as being positively impacted by OWMC facilities.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Positively Affected by the Presence of OWMC Facilities

The sales data are presented in terms of thousands of dollars for the preceding financial year of the businesses.

RATIONALE/SIGNIFICANCE:
Total annual sales indicate the actual amount of economic activity that is positively impacted and recognizes differences in sales to labour input relationships among firms.

SOURCES OF INFORMATION:
Total annual sales were collected in the business survey. Non-responses were estimated with reference to similar businesses in the site vicinity (see Appendix B for an explanation of the estimation procedures).

INPUTS FROM OTHER CONSULTANTS:
None.

STUDY AREA:
Site Vicinity.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- The estimation procedure for total annual sales may have introduced slight and unavoidable inaccuracies. These inaccuracies were minimized by visually inspecting the businesses for which estimates were made.
- Since financial years vary from one company to the next, a consistent time period would not have been obtained.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Negatively Affected by the Presence of OWMC Facilities

FACILITY COMPONENTS AFFECTED:
All facilities.

FACTOR APPLIED FOR FOLLOWING OPTIONS:
Comparison of siting options.

DEFINITION OF FACTOR:
This factor relates to non-farm business operations in the site vicinity of the siting options that could be negatively affected by the presence of OWMC facilities.

RATIONALE/SIGNIFICANCE:
This factor is related to the objective of minimizing the impact of OWMC facilities on the economic environment.

The factor inventories and describes the characteristics of business operations whose viability may be negatively affected by the location of OWMC facilities in their vicinity.

The factor is important for three reasons:
- It describes a negative change in economic activity;
- It indicates the nature of the negative impacts that may be anticipated around each siting option (it does not measure the extent to which these businesses may be affected, however); and
- It has ramifications for community life in general.

SOURCES OF INFORMATION:
Information on business characteristics was gathered from a survey of businesses conducted by Clayton Research Associates during the summer and fall of 1984. The businesses were identified from

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Negatively Affected by the Presence of OWMC Facilities

municipal assessment rolls, site visits, air photos, maps and by other members of the site selection team.

INPUTS FROM OTHER CONSULTANTS:
Ecologistics Limited provided a list of agri-businesses they were not studying in their analysis. The inclusion of these agri-businesses ensured a complete accounting of economic activity. The Institute of Environmental Research provided a list of home-businesses that were identified during the "Walk and Talk Program".

INTERPRETATION/METHODOLOGY:
The site vicinity boundaries were generally two kilometres from the centre of the candidate site. If there was a business activity located outside the boundary, but close to it, the boundary was extended to include the activity.

The locations of the non-farm businesses were verified by site visits. When the owner or appropriate senior official of the business refused to supply employment and sales information, or when they refused to provide an opinion on the impact of OWMC facilities, this information was estimated by taking into account the characteristics of similar businesses in the site vicinity of the candidate sites (this procedure is described in Appendix B).

The reasons stated by the respondent for the negative effects of OWMC facilities on their businesses were verified against: (1) known characteristics of OWMC facilities; (2) the business location; and (3) its operational characteristics. On a few occasions, perceived negative effects were upgraded by Clayton Research Associates to "no effect" (none were changed to "positive effect", however). This procedure is described in Appendix B.

A confidential data sheet was compiled on each business. These data sheets contain information obtained through the business surveys, the estimation procedures applied (if appropriate), site characteristics and photographs.

COMMENTS/ASSUMPTIONS/LIMITATIONS

- The survey information provided by Ecologistics Limited and the Institute of Environmental Research on agri- and home-businesses respectively, may not have been complete. Any activities missed would probably not represent a significant employment or sales potential (otherwise they would have been visible during the site inspections).

- Any survey data will have biases. The size and the nature of the businesses were checked visually to establish that the employment and sales figures, and estimates, appeared reasonable.

- The data from the survey relates to the time period when the survey was undertaken.

- The estimation procedure for sales and employment levels, and where necessary, for possible negative impacts, may have introduced slight and unavoidable inaccuracies.

- Whereas it was theoretically possible for a business to be both negatively and positively impacted at the same time, no business responded in this manner during the business survey.

INDICATOR:
(1) Number of Businesses

DEFINITION: This indicator is a numerical count of all businesses located in the site vicinity of the siting options which are identified as being negatively impacted by OWMC facilities. These businesses include commercial and industrial operations, home-businesses and agri-businesses, tourist and recreational establish-

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Negatively Affected by the Presence of OWMC Facilities

ments. The larger the number of these businesses, the greater the potential for negative impact.

RATIONALE/SIGNIFICANCE:
The number of businesses provides an indication of the potential breadth of negative impacts - generally, the negative impacts would likely be greater if a specified level of economic activity was being undertaken by several smaller firms rather than a single large firm.

SOURCES OF INFORMATION:

- Field survey;
- Assessment rolls;
- Other site selection team surveys;
- Air photographs; and
- Maps.

INPUTS FROM OTHER CONSULTANTS:

- Agri-business list obtained from Ecologistics Limited; and
- Home-business list obtained from the Institute of Environmental Research.

STUDY AREA:
Site Vicinity.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- A complete coverage of agri- and home-businesses may not have been attained in the Ecologistics Limited and Institute of Environmental Research surveys.

INDICATOR:
(2) Number of Employees

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Negatively Affected by the Presence of OWMC Facilities

DEFINITION: This indicator is a count of the number of employees (both full-time and part-time) working at the businesses identified as being negatively impacted by OWMC facilities.

RATIONALE/SIGNIFICANCE:
The number of employees indicates the actual amount of economic activity being negatively impacted and recognizes differences in labour intensity among firms.

SOURCES OF INFORMATION:
The number of full-time and part-time employees was collected in the business survey. Non-responses were estimated with reference to similar businesses in the site vicinity (see Appendix B for an explanation of the estimation procedures).

INPUTS FROM OTHER CONSULTANTS:
None.

STUDY AREA:
Site Vicinity.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

° The procedures utilized to estimate employment may have introduced slight and unavoidable inaccuracies. These inaccuracies were minimized by visually inspecting the businesses for which estimates were made.

° Part-time employment was converted to a total employment figure utilizing a ratio based on the average hours worked by full- and part-time employees in Canada.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: CLAYTON RESEARCH ASSOCIATES LIMITED

FACTOR GROUPING: Businesses	**FACTOR:** Business Activity Negatively Affected by the Presence of OWMC Facilities

INDICATOR:
(3) Annual Sales

DEFINITION: This indicator measures the total sales of businesses identified as being negatively impacted by OWMC facilities. The sales data is presented in terms of thousands of dollars for the preceding financial year of the businesses.

RATIONALE/SIGNIFICANCE:
Total annual sales indicate the actual amount of economic activity that is negatively impacted and recognizes differences in sales to labour input relationships among firms.

SOURCES OF INFORMATION:
Annual sales were collected in the business survey. Non-responses were estimated with reference to similar businesses in the vicinity (see Appendix B for an explanation of the estimation procedures).

INPUTS FROM OTHER CONSULTANTS:
None.

STUDY AREA:
Site Vicinity.

COMMENTS/ASSUMPTIONS/LIMITATIONS:
- The estimation procedure for total annual sales may have introduced slight and unavoidable inaccuracies. These inaccuracies were minimized by visually inspecting the businesses for which estimates were made.
- Since financial years vary from one company to the next, a consistent time period would not have been obtained.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: CLAYTON RESEARCH ASSOCIATES LIMITED

FACTOR GROUPING: Businesses	**FACTOR:** Community and Regional Economic Base

FACILITY COMPONENTS AFFECTED:
All facilities.

FACTOR APPLIED FOR FOLLOWING OPTIONS:
Comparison of siting options.

DEFINITION OF FACTOR:
This factor relates to the overall effects of OWMC facilities on the community and regional economy.

RATIONALE/SIGNIFICANCE:
This factor is related to the objective of minimizing the impacts of OWMC facilities on the economic environment.

The factor does not refer to the complete economic base of the candidate municipalities since other members of the site selection team were examining certain critical aspects of the economy: Ecologistics Limited had responsibility for analyzing agricultural impacts; Laventhol & Horwath Limited had responsibility for analyzing tourism impacts; and Leon Kentridge and Associates had responsibility for business impacts along access roads.

The factor is important for three reasons:
- It describes a change in economic activity;
- It indicates the degree of economic change that may be caused in the municipalities where siting options are located; and
- It has ramifications for community life in general and for other factors used in the site selection process (such as municipal finance).

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Community and Regional Economic Base

SOURCES OF INFORMATION:

- Employment estimates of the operating OWMC facilities;
- 1981 Census of Canada labour force and household information for the candidate municipalities;
- Labour surveys done by Ontario Hydro near its facilities; and
- Industrial directories of the candidate regional municipalities.

INPUTS FROM OTHER CONSULTANTS:
Monenco Limited provided an estimate of facilities employment by type of occupation for OWMC facilities operating at the 150,000 tonnes and 300,000 tonnes processing capacity.

INTERPRETATION/METHODOLOGY:
An employment multiplier was calculated which estimates the effect of OWMC facilities employment (direct employment) on the creation of indirect employment (employment created in activities that are linked to the facilities as suppliers) and induced employment (employment created in the non-basic sector of the municipalities as a result of the expenditures from the income generated by the direct and indirect employment). The methodology is based on procedures outlined in A Guide to Regional Multiplier Estimation, prepared by Professor Harvey Schwartz of York University for the Project Assessment and Evaluation Branch of the Federal Department of Regional Economic Expansion. The methodology is explained in detail in Appendix D.

Estimates of the number of households that would locate in each candidate municipality as a result of OWMC facilities were based on these regional employment estimates. The methodology is explained in detail in Appendix E.

The perceptions of community economic impact were obtained from responses to the business surveys conducted in the site vicinity and on-site of each siting option.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING:	**FACTOR:**
Businesses	Community and Regional Economic Base

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- This factor is based on estimates of possible future impact rather than on an inventory of actual phenomena which currently exist in the study area.

- While the factor is entitled Community and Regional Economic Base, it does not cover the full range of possible economic impacts on the economic base around the siting options: Ecologistics Limited examined potential impacts on agriculture; Laventhol & Horwath Limited examined potential impacts on the tourism industry; and Leon Kentridge and Associates examined potential impacts on businesses along access roads.

- Any survey data will have biases. While the interviewer checked that each respondent had a good understanding of the nature of OWMC facilities as the interview began, some biases and misconceptions may have persisted. Indeed, the exact nature of OWMC facilities was still somewhat unclear in the summer of 1984, and modifications to critical facilities components occurred later.

- The procedure used to generate employment and household estimates may have introduced slight and unavoidable inaccuracies.

INDICATOR:
(1) Number of New Jobs Created

DEFINITION: This indicator relates to the estimated number of new jobs created due to the direct employment of OWMC operations personnel in the regional municipality as well as to the indirect and induced employment resulting from these jobs. The employment is estimated for facilities processing 300,000 tonnes of special wastes in the tenth year of operation.

RATIONALE/SIGNIFICANCE:
The number of new jobs created in a region, both directly at the facilities and indirectly by its spin-off effects, is a fundamental

LEAD CONSULTANT: CLAYTON RESEARCH ASSOCIATES LIMITED

FACTOR GROUPING: Businesses	**FACTOR:** Community and Regional Economic Base

generator of economic activity. This indicator addresses these fundamental forces.

SOURCES OF INFORMATION:
- Employment estimates for OWMC facilities processing 300,000 tonnes and 150,000 tonnes of special wastes;
- 1981 Census of Canada labour force statistics;
- Industrial directories for the candidate regional municipalities; and
- Facilities characteristics assumptions provided by OWMC.

INPUTS FROM OTHER CONSULTANTS:
- Monenco Limited provided estimates of operations personnel by facilities component for the tenth year of operation for the 300,000 and 150,000 tonnes processing capacity assumptions; and
- OWMC and the site selection team provided regular listings and updates of facilities characteristics assumptions.

STUDY AREA:
Community and Regional.

COMMENTS/ASSUMPTIONS/LIMITATIONS:
- The employment created is considered at a regional level only since area municipalities are part of a broader labour market.

- A sensitivity test was undertaken for facilities having a processing capacity of 150,000 tonnes after ten years of operation to compare it with the base case processing capacity of 300,000 tonnes.

- Assumptions regarding estimation methodologies are documented in Appendix D.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Community and Regional Economic Base

INDICATOR:
(2) Number of Additional Households Created

DEFINITION: This indicator estimates the number of new households that will locate in both the candidate area and regional municipalities due to the operation of OWMC facilities.

RATIONALE/SIGNIFICANCE:
The number of new households attracted to the candidate municipalities provides an indication of the potential benefits the facilities will generate (in terms of a larger market for goods and services, for instance). The information is also used in the municipal finance impact analysis to estimate the revenues and costs that each candidate municipality will face due to the increased level of activity resulting directly or indirectly from the facilities.

SOURCES OF INFORMATION:

- Estimates of new job creation in the regional municipalities (the first indicator);
- 1981 Census of Canada labour force information; and
- Ontario Hydro labour force surveys at major generating stations.

INPUTS FROM OTHER CONSULTANTS:

- The Institute of Environmental Research provided information on the number of households that stated they would move due to the construction of OWMC facilities. This information was gathered during the Phase 4A "Walk and Talk Program".

STUDY AREA:
Community and Regional.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING: Businesses	**FACTOR:** Community and Regional Economic Base

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- The household estimates relate to the number of households in the candidate municipalities after ten years of facilities operations. They do not relate to the first year of operation when the facilities will be processing smaller amounts of special wastes.
- Assumptions regarding estimation methodologies are documented in Appendix E.
- The number of households generated by the facilities is estimated for both the area and regional municipality (unlike job creation, the first indicator, which is estimated only for the regional municipality) because the creation of new households brings ancillary benefits to both municipalities.

INDICATOR:
(3) Perceptions of Community Economic Impact

DEFINITION: This indicator relates to the perceptions of the owners or senior officials of businesses on the siting options and in the site vicinity of the siting options as to the perceived impact (positive or negative) OWMC facilities are expected to have on business conditions in their community.

RATIONALE/SIGNIFICANCE:
The perceptions of business operators affect their investment intentions. This indicator gauges the perceptions of the business operators located in the possible impact zone of the facilities.

SOURCES OF INFORMATION:
Business survey conducted by Clayton Research Associates in the summer and the fall of 1984.

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT: **CLAYTON RESEARCH ASSOCIATES LIMITED**

FACTOR GROUPING:	**FACTOR:**
Businesses	Community and Regional Economic Base

INPUTS FROM OTHER CONSULTANTS:

- ° Agri-business list obtained from Ecologistics Limited.
- ° Home-business list obtained from the Institute of Environmental Research.

STUDY AREA:
Community and Regional. However, since the information was collected only in the site vicinity of the siting options, this indicator is considered to be an area municipality indicator.

COMMENTS/ASSUMPTIONS/LIMITATIONS:

- ° A complete coverage of agri- and home-businesses may not have been attained in the Ecologistics Limited and Institute of Environmental Research surveys. The two kilometre areas around the centre of the siting options were visually checked to determine if any larger activities had been missed in the initial inventory of economic activity. If a farm operator did not reveal any ancillary activities in the Ecologistics Limited survey, Clayton Research Associates would be unaware of any additional agri-businesses.

- ° The biases in the survey were reduced as much as possible by the interviewer ensuring that the respondents were aware of what OWMC was proposing before their opinions were sought. Since the facilities characteristics have changed somewhat since the summer of 1984, when the survey was conducted, the responses may not be the same if the survey were to be repeated.

- ° Since the survey was conducted in the vicinity of the siting options, where the potential impacts would be the greatest, the survey likely covered the vast majority of businesses that could be either positively or negatively affected. It is assumed that: (1) these businesses knew more about OWMC facilities than other businesses in the municipality, due to their proximity; and (2) their opinions regarding the impact of OWMC facilities on the

OWMC PHASE 4A - FACTORS FOR SITE SELECTION

LEAD CONSULTANT:	**CLAYTON RESEARCH ASSOCIATES LIMITED**
FACTOR GROUPING: Businesses	**FACTOR:** Community and Regional Economic Base

business conditions of the area municipalities are representative of other businesses in the municipality.

APPENDIX B
DESCRIPTION OF BUSINESS SURVEY

TABLE OF CONTENTS

Page

Introduction B-1

Methodology of the Business Survey B-2

Questionnaire Scope B-5

Analysis of Responses B-9

Classification of Businesses by Anticipated Nature of OWMC Facilities Impact B-15

Results of the Business Survey B-19

Maps Outlining Location of Businesses by Business Type for Candidate Sites B-26

Business Survey Questionnaire B-26

APPENDIX B
DESCRIPTION OF BUSINESS SURVEY

INTRODUCTION

PURPOSE OF THE APPENDIX

This appendix provides a detailed description of the business survey conducted by Clayton Research Associates as part of the Phase 4A site selection process. Subjects covered in this appendix include the purpose of the survey, the methodology for the survey (including the rationale for the selected study areas), a definition of businesses, the questionnaire design, the survey procedures, an analysis of responses and the estimation of non-responses. The appendix also presents the results of the survey. Finally, maps showing the location of each business respondent and its business type by candidate site as well as a copy of the business survey questionnaire are also presented.

OBJECTIVE OF THE BUSINESS SURVEY

The objective of the business survey was to determine the number of businesses affected by OWMC's special waste treatment facilities and to ascertain whether these businesses would be positively or negatively affected. General characteristics of the business respondents, such as employment and sales levels, were to be gathered and the perceptions and attitudes of the business respondents towards OWMC facilities were also to be noted.

The results of the business survey provide input for the economic base impact analysis in terms of business activity displacement, the impact of the facilities on businesses in their vicinity and the perceived economic impact of the facilities on the community. These results are input for the economic base factors studied in detail by Clayton Research Associates.

METHODOLOGY OF THE BUSINESS SURVEY

SELECTION OF STUDY AREAS*

The business survey covered three distinct geographical areas. The first two zones include the site and the two kilometre zone surrounding the centre of the site. The third area encompasses businesses in the communities of Wellandport and Bismarck near candidate sites LF-3C and LF-9C in the Township of West Lincoln.

Site

The site is defined as being the geographic area encompassed within the maximum potential acquisition boundary as outlined by OWMC base mapping.** Any business operations located within this geographic boundary would be acquired by OWMC for construction of the facilities.

Site vicinity

The site vicinity encompasses a two kilometre zone measured from the centre of the site. This zone was selected so as to provide a reasonable estimate of the impacts of OWMC facilities on businesses in the site vicinity from which siting options could be compared and ranked.

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* Businesses on and near candidate site LF-2N in the City of Mississauga were also surveyed. Since this site has been dropped from consideration by OWMC, the results of the Mississauga survey are not presented here (see M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Interim Site Selection Report, Candidate Site LF-2N, 1985).

** Property ownership maps, prepared by Ecologistics Limited, provided the base data on site areas.

Wellandport and Bismarck

The business survey was extended to encompass the communities of Wellandport and Bismarck near candidate sites LF-3C and LF-9C in the Township of West Lincoln. These communities were selected as they are support centres for neighbouring farm activities located on and in the vicinity of sites LF-3C and LF-9C.

IDENTIFICATION AND DEFINITION OF BUSINESSES

Home-business

A home-business is defined as a business activity that is conducted out of an individual's primary residence. In some instances, the home-business activity might be ancillary to the individuals primary occupation and conducted more on a "hobby" basis. However, the home-business activity may also be the primary occupation of the individual and the main source of household income.

Home-businesses were identified through the Institute of Environmental Research's (IER) portion of the "Walk and Talk Program" undertaken during the summer of 1984. If a consenting interviewee under this program mentioned that a business activity was conducted out of the home, IER noted the activity and presented the appropriate information to Clayton Research Associates. A survey was undertaken by Clayton Research Associates and the respondent was classified as a home-business.

Commercial/industrial business

A commercial/industrial business is defined as being a business operation not undertaken out of a place of residence as a home-business or related to tourist or recreational operations. It is also not an agri-business or a farm.

Commercial/industrial businesses were identified through two methods:

- Base maps and aerial photographs of the study areas were examined and windshield surveys were undertaken to identify business activities; and

- Assessment rolls of the municipalities where candidate sites are located were examined and any activities that were located within the study area (and assessed for business tax purposes) were surveyed by Clayton Research Associates.

Additional windshield surveys were conducted after the survey had been completed to identify any new commercial/industrial businesses up to December 31, 1984.

Agri-business

An agri-business is defined as a business activity ancillary to farm activities. Farms were surveyed by another member of the site selection team, Ecologistics Limited. Ecologistics Limited surveyed all farming operations and, if any business activities ancillary to the farm operations were identified, Clayton Research Associates was provided with a list of all activities. All activities on the list were then surveyed by Clayton Research Associates and classified as agri-businesses.

Tourist business

A tourist business is a service activity that is primarily generated by non-residents of a community. Activities such as trailer campgrounds would be typical of a tourist business.

Tourist businesses were identified by another member of the site selection team, Laventhol & Horwath, who provided Clayton Research Associates with a listing of such businesses.

Recreational business

A recreational business is defined as being a business activity derived from the leisure activities of individuals and families. Golf and country clubs are an example of a recreational business.

Institute of Environmental Research provided a list of recreational businesses within the site vicinity of all candidate sites.

Table B-1 shows the number and types of businesses surveyed by site and siting option.

QUESTIONNAIRE SCOPE

The survey questionnaire utilized in the business survey was broken down into five specific sections. Each section was designed to achieve specific results.

- Questions #2 and #3 (see questionnaire, page B-35) were designed to ascertain the awareness of OWMC in the community and knowledge of the facilities that OWMC is planning to construct.

TABLE B-1

NUMBER OF BUSINESSES SURVEYED BY TYPE ON-SITE AND IN THE SITE VICINITY CANDIDATE SITES AND SITING OPTIONS, 1984

Candidate Site	Home-Business	Agri-Business	Commercial/ Industrial	Tourist Business	Recreational Business	Total Business
LF-4N	0	10	5	0	0	15
PI-1N	2	11	3	0	1	17
PI-13N	2	3	5	0	1	11
LF-9C	0	5	3	0	1	9
LF-3C	0	5	5	0	0	10
PI-27E	2	3	18	1	2	26
LF-1E	5	7	7	0	2	21
Siting Option*						
LF-3C	0	5	5	0	0	10
LF-9C	0	5	3	0	1	9
LF-1E	5	7	7	0	2	21
LF-1E/PI-27E	7	8	24	1	3	43
LF-4N/PI-1N	2	16	8	0	1	27
LF-4N/PI-13N	2	14	9	0	1	26

* Double counted businesses have been removed from siting options LF-1E/PI-27E and LF-4N/PI-1N.

- Questions #4 through #6 and #16 and #17 were designed to gather background data relating to the business operations of the respondent. The objective was to gather an understanding of the particular business operation through information on employment, other locations of the business, past and future business expansions, annual sales and total payroll. Due to the possible sensitivity of responding to questions on annual sales and total payroll, these two questions were asked near the end of the interview.

- Question #7 attempted to determine whether the respondent perceived OWMC facilities as having any effects on the operation of his or her business. If the respondent replied "yes", a further question was asked to solicit whether the perceived effects would be beneficial, detrimental or unknown.

- Questions #8 through #14 were designed to solicit the respondents opinion and rationale on several issues related to OWMC facilities. The issues included the perception of economic benefits and disbenefits of the facilities for the local community, contact with other business operators regarding the possible impact of OWMC facilities, future impacts on business if, in fact, the facilities were constructed, and businesses leaving their present location should OWMC facilities be located in their community. The questions also solicited the respondents perception of potential benefits to his or her business arising from the facilities and perceptions on general business conditions within the community.

- Questions #15 through #21, excluding #16 and #17, were designed to obtain information on the business respondent including name, address, telephone number and whether the business was incorporated.

SURVEY PROCEDURES

Method

The businesses were surveyed through telephone interviews due to the relative convenience for the business respondent. The person contacted within the business was either the owner or an individual in senior management when the owner was unavailable.

If the desired respondent was not contacted in the initial telephone call, a message was left outlining the interviewer's name, the name of the firm (Clayton Research Associates) and the purpose of the telephone call. A maximum of three telephone calls were initiated by the interviewer and, if all three proved unsuccessful, the interview was classified as a refusal.

Eight respondents requested to complete the survey in writing and Clayton Research Associates provided them with copies of the questionnaire. Five of these questionnaires were returned and the remaining three were classified as refusals.

Time of year

The majority of the business interviews were undertaken during the summer and fall of 1984. However, if periodic windshield surveys revealed the establishment of any new business activities after the fall of 1984, these were surveyed up to December 31, 1984.

Verification procedure

When all business surveys were completed and the analysis and aggregation of statistical data had commenced, it was apparent that several completed questionnaires displayed confusing or contradictory data or comments. Three business repondents were re-interviewed and clarifications were obtained concerning the opinions expressed during the first interviews.

ANALYSIS OF RESPONSES

RESPONSE RATES

A total of 121 businesses were identified in the relevant study areas and the communities of Wellandport and Bismarck in the Township of West Lincoln.* Two businesses were unable to be contacted. One business was found to be no longer operating and three were deleted because they were incorrectly identified as businesses, leaving a total of 115 businesses.

A total of ten refusals were encountered resulting in an overall response rate of approximately 91 percent. Table B-2 presents response rates by candidate site, siting option and type of business.

TABULATION OF RESPONSES

To provide a basis for analysis of the business survey, the individual responses were categorized by business type, by geographic area, by the perceived effect of OWMC facilities on business activity and finally by candidate site and siting option.

Since the location of some candidate sites are in close proximity to others, certain businesses were allocated to two candidate

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* Candidate site LF-2N in the City of Mississauga is excluded. See M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Interim Site Selection Report, Candidate Site LF-2N, 1985.

TABLE B-2

RESPONSE RATE TO THE BUSINESS SURVEY CANDIDATE SITES, SITING OPTIONS AND BUSINESS TYPE, 1984

Candidate Site*	Completed Interview	Non-Response	Total Business	Response Rate (Percent)
LF-4N	13	2	15	86.7
PI-1N	17	0	17	100.0
PI-13N	11	0	11	100.0
LF-9C	9	0	9	100.0
LF-3C	9	1	10	90.0
PI-27E	23	3	26	88.5
LF-1E	17	4	21	81.0
Siting Option**				
LF-3C	9	1	10	90.0
LF-9C	9	0	9	100.0
LF-1E	17	4	21	81.0
LF-1E/PI-27E	37	6	43	86.0
LF-4N/PI-1N	25	2	27	92.6
LF-4N/PI-13N	24	2	26	92.3
Business Type***				
Agri-Business	32	5	37	86.5
Home-Business	8	2	10	80.0
Commercial/ Industrial	43	2	45	95.6
Tourist	1	0	1	100.0
Recreational	6	0	6	100.0

* A total of 15 completed interviews were obtained in the communities of Wellandport and Bismarck. One refusal was encountered. These responses are not included in this table.

** Double counted businesses have been removed from siting options LF-1E/PI-27E and LF-4N/PI-1N.

*** Excludes responses from candidate site LF-2N in the City of Mississauga.

sites. In Milton, five businesses were allocated to both candidate sites LF-4N and PI-1N. In Niagara Falls, five businesses were also allocated to both candidate sites LF-1E and PI-27E. However, when siting options LF-4N/PI-1N and LF-1E/PI-27E were analyzed, the business survey data were adjusted to ensure there was no double counting of these businesses.

VERIFICATION

A windshield survey of each business respondent was conducted to ensure the characteristics stated in the interviews corresponded to the physical details of the business.

ESTIMATION OF NON-RESPONSES AND RESPONSES

To ensure the business survey represented an accurate account of the business activity for a particular candidate site or siting option, Clayton Research Associates employed estimation procedures. Both the major business characteristics of the non-respondents and specific data which respondents refused to divulge were estimated by Clayton Research Associates.

Employment

The estimating procedure utilized to determine full- and part-time employment began with an examination of the business activity of the non-respondents. Assessment rolls provided an initial indication of the non-respondents' nature of business. This was supplemented by data from other members of the site selection team, notably Ecologistics Limited and Institute of Environmental Research.

When a clearer definition of the business activity was achieved, specific averages for this activity, based on other businesses surveyed, were applied to estimate the full- and part-time employment of each non-respondent.

For example, to estimate the employment for a non-respondent identified as an agri-business, the average full- and part-time employment of all other agri-businesses surveyed would be applied to this business. An average value of three full-time employees and one part-time employee would be applied to this non-response (based on the 32 completed agri-business surveys).

Non-responses to the question on business employment for commercial/industrial activities were estimated in a similar manner. A non-response commercial/industrial business would be assigned the average employment of all other commercial/industrial activities surveyed, excluding three large industrial operations (the Ford Motor Company glass plant, Cyanamid Canada and B.F. Goodrich) as they were not representative of the majority of commercial/industrial activities surveyed by Clayton Research Associates. A value of ten full-time and four part-time employees would be applied to this non-response representing the average full- and part-time employment of 43 commercial/industrial businesses surveyed.

The full- and part-time employment was estimated for a total of nine non-responses and for one respondent who did not wish to release the firm's employment statistics.

Table B-3 presents the percentage of employment and annual sales data estimated by Clayton Research Associates by siting option and by business type.

Annual sales

Similar to the estimation procedure for full- and part-time employment, the estimation procedure for annual sales began with an exam-

TABLE B-3

EMPLOYMENT AND ANNUAL SALES DATA ESTIMATED BY CLAYTON RESEARCH BY AREA AND BUSINESS IMPACT SITING OPTIONS, 1984, PERCENT

Siting Option	Site: Displaced: Percent Estimations of Total Employment: Full	Part	Percent Estimations of Annual Sales	Site Vicinity: Negatively Affected: Percent Estimations of Total Employment: Full	Part	Percent Estimations of Annual Sales	Positively Affected: Percent Estimations of Total Employment: Full	Part	Percent Estimations of Annual Sales
LF-3C	0	0	0	5	7	15	0	0	0
LF-9C	0	0	0	0	0	0	0	0	100
LF-1E	32	24	10	0	0	95	0	0	0
LF-1E/PI-27E	59	58	40	2	0	42	1	27	98
LF-4N-PI-1N	0	0	40	18	12	46	0	0	0
LF-4N/PI-13N	0	0	52	8	5	25	0	0	0

EMPLOYMENT AND ANNUAL SALES DATA ESTIMATED BY CLAYTON RESEARCH BY BUSINESS TYPE ALL CANDIDATE SITES*, 1984

Business Type	Estimated Employment: Full	Part	Estimated Annual Sales ($000)	Total Employment: Full	Part	Total Annual Sales ($000)	Percent Estimations of Total Employment: Full	Part	Percent Estimations of Annual Sales
Agri-Business	15	5	1,406	100	44	6,162	15	11	23
Home-Business	2	1	133	14	8	234	14	13	57
Commercial/ Industrial	30	12	82,852**	1,854	91	117,196**	2	13	71
Tourist	0	0	0	1	16	250	0	0	0
Recreational	0	0	1,400	78	12	2,375	0	0	59

* Site LF-2N in the City of Mississauga is excluded.

** Sales of three large industrial operations near site PI-27E in the City of Niagara Falls were estimated. The Ford Motor Company glass plant, Cyanamid Canada (Welland plant) and B.F. Goodrich did not reveal the annual sales of their specific operations in Niagara Falls and had to be estimated by Clayton Research Associates. Annual sales were estimated at $60,000 per employee which was the actual figure for a similar industrial structure near candidate site LF-4N.

ination of the nature of the business activity of the non-respondents. Assessment rolls and information provided from other members of the site selection team aided in gaining some understanding of nature of the non-respondents' business activity. Specific averages for this activity were then applied to estimate the annual sales for each non-respondent. For example, a non-response agri-business would be assigned an annual sales level of $174,000, which represents the average annual sales of all agri-businesses surveyed by Clayton Research Associates.

The same method was applied to commercial/industrial business non-respondents. An annual sales value of $842,000, the average annual sales of all commercial/industrial businesses surveyed by Clayton Research Associates, excluding the three large firms noted previously, were applied to these non-responses.

Annual sales data were estimated for a total of nine non-respondents. The following examples outline the procedure used for estimating annual sales of a business respondent who did not wish to reveal the value of annual sales.

- A golf and country club refused to reveal its annual revenues. Three other golf and country clubs were surveyed and the annual revenues of the three consenting respondents were tabulated and an average value was applied to the first respondent.

- A small hobby farm with one full-time employee renting horse stables did not wish to reveal its annual revenues. Another respondent in the same municipality renting horse stables with one full-time and one part-time employee did reveal their annual revenues. The revenues of the latter respondent was applied to the former respondent.

- A custom operator refused to reveal the annual sales of its operation. Two other custom operators in the study area did reveal their sales figures and the average sales of the two custom operators was applied to the first custom operator.

CLASSIFICATION OF BUSINESSES BY ANTICIPATED NATURE OF OWMC FACILITIES IMPACT

The methodology for classifying individual businesses by the nature of the impact OWMC facilities are anticipated to have is based on the perceptions of the respondents as revealed by their responses to questions in the business survey (Question #7, page B-38). However, there are limitations to a total reliance on the responses received:

- The survey was conducted at one point in time, the summer and fall of 1984, and the perceptions of respondents regarding the impact of OWMC facilities on their business activity may change;
- Respondents may not have related their true opinions to the interviewer; and
- Respondents may not have been fully aware of the issues relating to OWMC facilities and hence may have had a fear of the unknown and expressed negative perceptions.

Each response was carefully examined for logic and consistency throughout the questionnaire and compared to the responses of comparable business operations. The reliability of the responses to these questions, and the possibility that the responses could change, is taken into account during in the ranking of factors, indicators and sub-indicators. Generally, data which measure perceptions are assigned lower rankings.

Table B-4 presents data on business activities classified by the nature of the anticipated OWMC facilities impact on their business and specific business type.

Examples of the opinions and perceptions expressed by respondents include:

- Operators of horse stables and riding academies perceived that waste treatment facilities in the community would detract from the rural atmosphere. Many of these respondents believed that air pollution from the facilities and the increased vehicular traffic on local roads would deter horse owners from riding in the area.
- Some commercial/industrial business operators believed they would benefit from OWMC facilities as their costs for disposing liquid industrial wastes would be reduced.
- Recreational business operators generally believed customers would not wish to participate in leisure activities within proximity of waste treatment facilities, resulting in lost revenue for their business.

In some instances, Clayton Research Associates did not agree with the assessment the respondent offered with respect to the impact of the facilities on their business activity and the impact was adjusted accordingly. A total of six adjustments were made, two for candidate sites PI-27E and PI-13N and one each for candidate sites LF-1E and PI-1N. In terms of business type, five were commercial/industrial activities and the remaining activity was a home-business. The adjustments and rationale are as follows:

TABLE B-4

BUSINESS ACTIVITIES CLASSIFIED BY ANTICIPATED FACILITIES IMPACT AND BUSINESS TYPE ALL CANDIDATE SITES*, 1984

Business Type	Displaced	Negatively Affected	Positively Affected	No Effect	Total
Agri-Business	8	26	0	3	37
Home-Business	3	4	0	3	10
Commercial/ Industrial	3	10	15	17	45
Tourist (Trailer Campground)	0	1	0	0	1
Recreational	0	4	0	2	6

* Excludes responses from candidate site LF-2N in the City of Mississauga.

- A truck haulage operator believed the facilities would be detrimental to the operation of the business as a building utilized by the operator would be acquired by OWMC. Since the completion of the survey, the site boundaries have altered and the respondent's building would no longer be acquired by OWMC. This response was adjusted to a no effect classification.

- An operator selling soccer supplies, fearing the business location would be acquired by OWMC, believed he would be unable to continue a specific production feature of the business if relocation was necessary. The respondent's perception that the spray painting of soccer flags could not be conducted elsewhere, which would effectively curtail the business operation, did not seem reasonable. The response was adjusted to a no effect classification.

- An automobile service station operator believed the planned facilities would be detrimental as they wouldn't provide any "good". The respondents business activity is not located on an access route and is situated some distance from the candidate site. The response was adjusted to a no effect classification.

- A pre-cast concrete manufacturing operator believed the business operation would be negatively affected due to increased truck traffic. As the business is not located on an access route and is situated some distance from the site, the response was adjusted to a no effect classification.

- A woodworking operator believed many people would move out of the community and he would lose business. As the actual number of people and households displaced from the candidate sites is small, the response was adjusted to a no effect classification. Clayton Research Associates has assumed there will be no out-migration from the candidate municipalities resulting from OWMC facilities, except from the selected site.

- A landscaping/snow removal operator believed excessive traffic would impair the ability of the business to operate effectively. However, the increase in traffic flow would not be significant enough to affect this business activity in a detrimental manner.* The response was adjusted to a no effect classification.

RESULTS OF THE BUSINESS SURVEY

Tables B-5 through B-9 on the following pages present the tabulations of the business survey:

- Table B-5 presents the number of business activities classified by anticipated facilities impact for the candidate sites and siting options.
- Table B-6 presents the number of employees of business activities by anticipated facilities impact for the candidate sites and siting options.
- Table B-7 presents the annual sales of business activities by anticipated facilities impact for the candidate sites and siting options.
- Table B-8 presents business perceptions of community economic impacts by candidate sites and siting options.

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* See M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Transportation, 1985.

- Table B-9 presents business perceptions of community economic impacts by type of business.

TABLE B-5

BUSINESS ACTIVITIES CLASSIFIED BY ANTICIPATED FACILITIES IMPACT CANDIDATE SITES AND SITING OPTIONS, 1984

Candidate Site	Displaced	Negatively Affected	Positively Affected	No Effect	Total
LF-4N	2	9	1	3	15
PI-1N	3	10	0	4	17
PI-13N	1	7	1	2	11
LF-9C	0	4	1	4	9
LF-3C	0	9	0	1	10
PI-27E	2	7	11	6	26
LF-1E	6	6	1	8	21
Siting Option*					
LF-3C	0	9	0	1	10
LF-9C	0	4	1	4	9
LF-1E	6	6	1	8	21
LF-1E/PI-27E	7	12	12	12	43
LF-4N/PI-1N	5	14	1	7	27
LF-4N/PI-13N	3	16	2	5	26

* Double counted businesses have been removed from siting options LF-1E/PI-27E and LF-4N/PI-1N.

TABLE B-6

NUMBER OF BUSINESS ACTIVITY EMPLOYEES* CLASSIFIED BY ANTICIPATED FACILITIES IMPACT CANDIDATE SITES AND SITING OPTIONS, 1984

Candidate Site	Displaced	Negatively Affected	Positively Affected	No Effect	Total
LF-4N	5	30	125	114	274
PI-1N	9	23	0	8	40
PI-13N	3	61	4	10	78
LF-9C	0	9	3	11	23
LF-3C	0	69	0	10	79
PI-27E	13	52	1,448	46	1,559
LF-1E	22	18	2	33	75
Siting Option**					
LF-3C	0	69	0	10	79
LF-9C	0	9	3	11	23
LF-1E	22	18	2	33	75
LF-1E/PI-27E	33	69	1,450	75	1,627
LF-4N/PI-1N	14	39	125	122	300
LF-4N/PI-13N	8	91	129	124	352

* Full- and part-time employees were combined by assuming part-time work is equivalent to 36.2 percent of full-time work (Statistics Canada, The Labour Force).

** Double-counted employees have been removed from siting options LF-1E/PI-27E and LF-4N/PI-1N.

TABLE B-7

ANNUAL SALES OF BUSINESS ACTIVITIES CLASSIFIED BY ANTICIPATED FACILITIES IMPACT CANDIDATE SITES AND SITING OPTIONS, 1984 ($000)

Candidate Site	Displaced	Negatively Affected	Positively Affected	No Effect	Total
LF-4N	129	1,277	7,500	15,568	24,474
PI-1N	580	827	0	216	1,623
PI-13N	140	3,041	68	205	3,454
LF-9C	0	355	68	52	475
LF-3C	0	2,348	0	740	3,088
PI-27E*	875	891	81,828	4,743	88,337
LF-1E	1,741	1,333	100	1,461	4,635
Siting Option**					
LF-3C	0	2,348	0	740	3,088
LF-9C	0	355	68	52	475
LF-1E	1,741	1,333	100	1,461	4,635
LF-1E/PI-27E	2,616	2,192	81,928	6,144	92,880
LF-4N/PI-1N	709	1,473	7,500	15,784	25,466
LF-4N/PI-13N	269	4,318	7,568	15,773	27,928

* Sales of three large industrial operations near site PI-27E in the City of Niagara Falls were estimated. The Ford Motor Company glass plant, Cyanamid Canada (Welland plant) and B.F. Goodrich did not reveal the annual sales of their specific operations in Niagara Falls and had to be estimated by Clayton Research Associates. Annual sales were estimated at $60,000 per employee which was the actual figure for a similar industrial structure near candidate site LF-4N.

** Double counted sales have been removed from siting options LF-1E/PI-27E and LF-4N/PI-1N.

TABLE B-8

BUSINESS PERCEPTIONS OF COMMUNITY ECONOMIC IMPACTS CANDIDATE SITES AND SITING OPTIONS, 1984

Candidate Site	Number Perceiving Economic Benefits*				Number Perceiving Economic Disbenefits*			
	Yes	No	No Opinion/ Don't Know	Total	Yes	No	No Opinion/ Don't Know	Total
LF-4N	6	7	0	13	11	1	1	13
PI-1N	2	13	2	17	12	4	1	17
PI-13N	1	10	0	11	10	1	0	11
LF-9C	2	5	2	9	7	1	1	9
LF-3C	2	7	0	9	8	1	0	9
PI-27E	15	8	0	23	14	8	1	23
LF-1E	7	8	2	17	9	5	3	17
Siting Option								
LF-3C**	2	7	0	9	8	1	0	9
LF-9C**	2	5	2	9	7	1	1	9
LF-1E	7	8	2	17	9	5	3	17
LF-1E/PI-27E	19	15	2	36	21	11	4	36
LF-4N/PI-1N	6	17	2	25	20	4	1	25
LF-4N/PI-13N	7	17	0	24	21	2	1	24

* Includes only businesses completing the survey.

** If responses from the rural agricultural service centre of Wellandport and Bismarck are included, the number of businesses perceiving economic benefits rises to five for both LF-9C and LF-3C and the number perceiving economic disbenefits rises to 19 and 20 for LF-9C and LF-3C, respectively.

TABLE B-9

BUSINESS PERCEPTIONS OF COMMUNITY ECONOMIC IMPACTS BY TYPE OF BUSINESS ALL CANDIDATE SITES*, 1984

Business Type	Number Perceiving Economic Benefits**				Number Perceiving Economic Disbenefits**			
Agri-Business	9	21	2	32	25	4	3	32
Home-Business	2	6	0	8	5	1	2	8
Commercial/ Industrial	16	23	4	43	29	13	1	43
Tourist	1	0	0	1	1	0	0	1
Recreational	2	4	0	6	6	0	0	0

* Excludes responses from candidate site LF-2N in the City of Mississauga.

** Includes only businesses completing the survey.

MAPS OUTLINING LOCATION OF BUSINESSES BY BUSINESS TYPE FOR CANDIDATE SITES

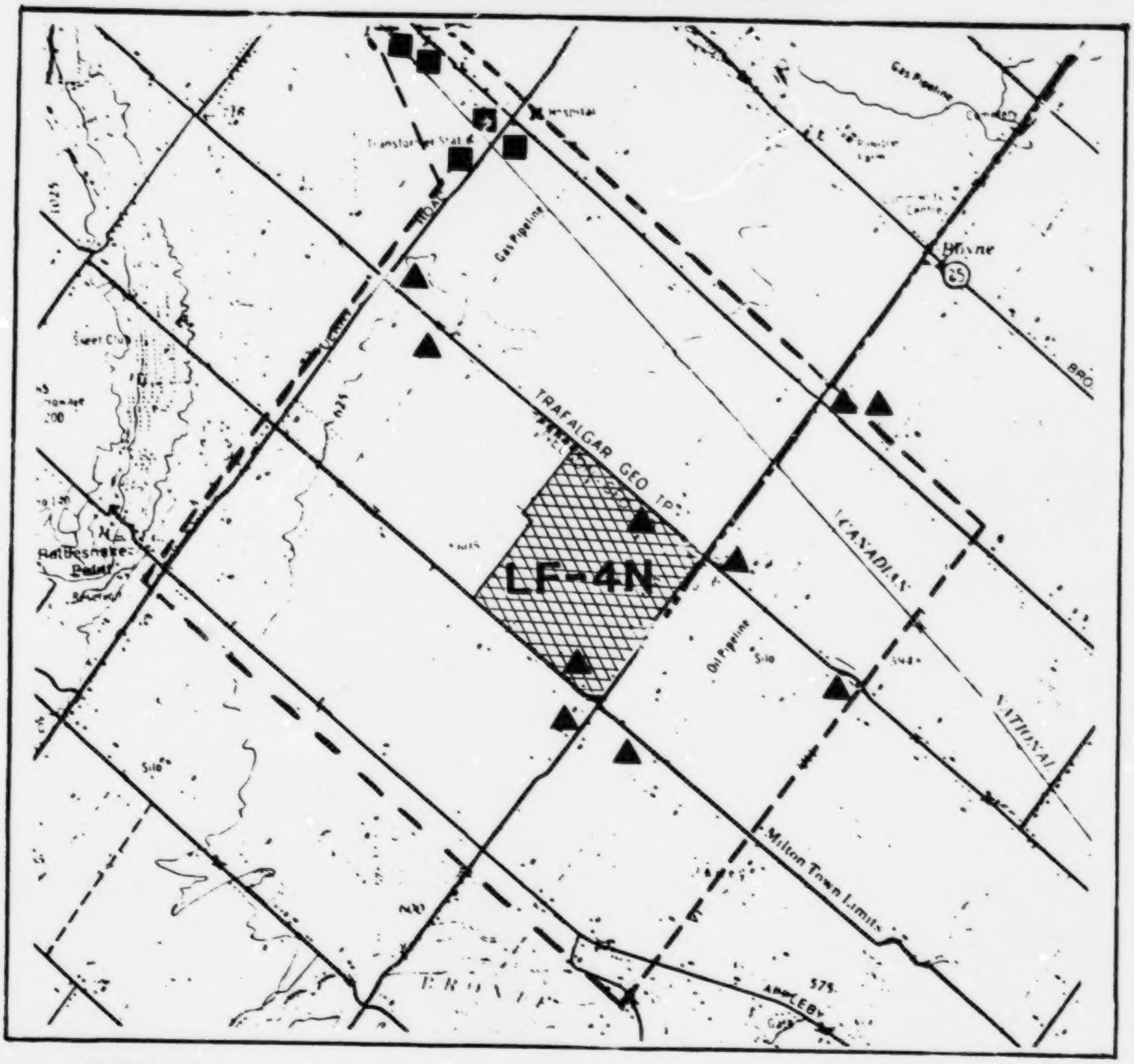
The maps on the following pages present the location of each business respondent for the seven candidate sites and for the communities of Wellandport and Bismarck in the Township of West Lincoln.

BUSINESS SURVEY QUESTIONNAIRE

A copy of the questionnaire used by Clayton Research Associates to conduct the business survey is also presented.

FIGURE B-1

BUSINESSES ON AND IN THE VICINITY OF SITE LF-4N, MILTON, 1984


LF-4N
TRAFALGAR GEO TP
CANADIAN
NATIONAL
Milton Town Limits
Gas Pipeline
Gas Pipeline
Oil Pipeline
Silo
Silo
Transformer Stat'n
Hospital
Rattlesnake Point
Sweet Clover
Bhyne
25
ROAD
APPLEBY

TYPE OF BUSINESS

Agri-Business ▲

Home-Business ◢

Commercial/Industrial ■

Tourist ◣

Recreational ●

▨ Candidate Site

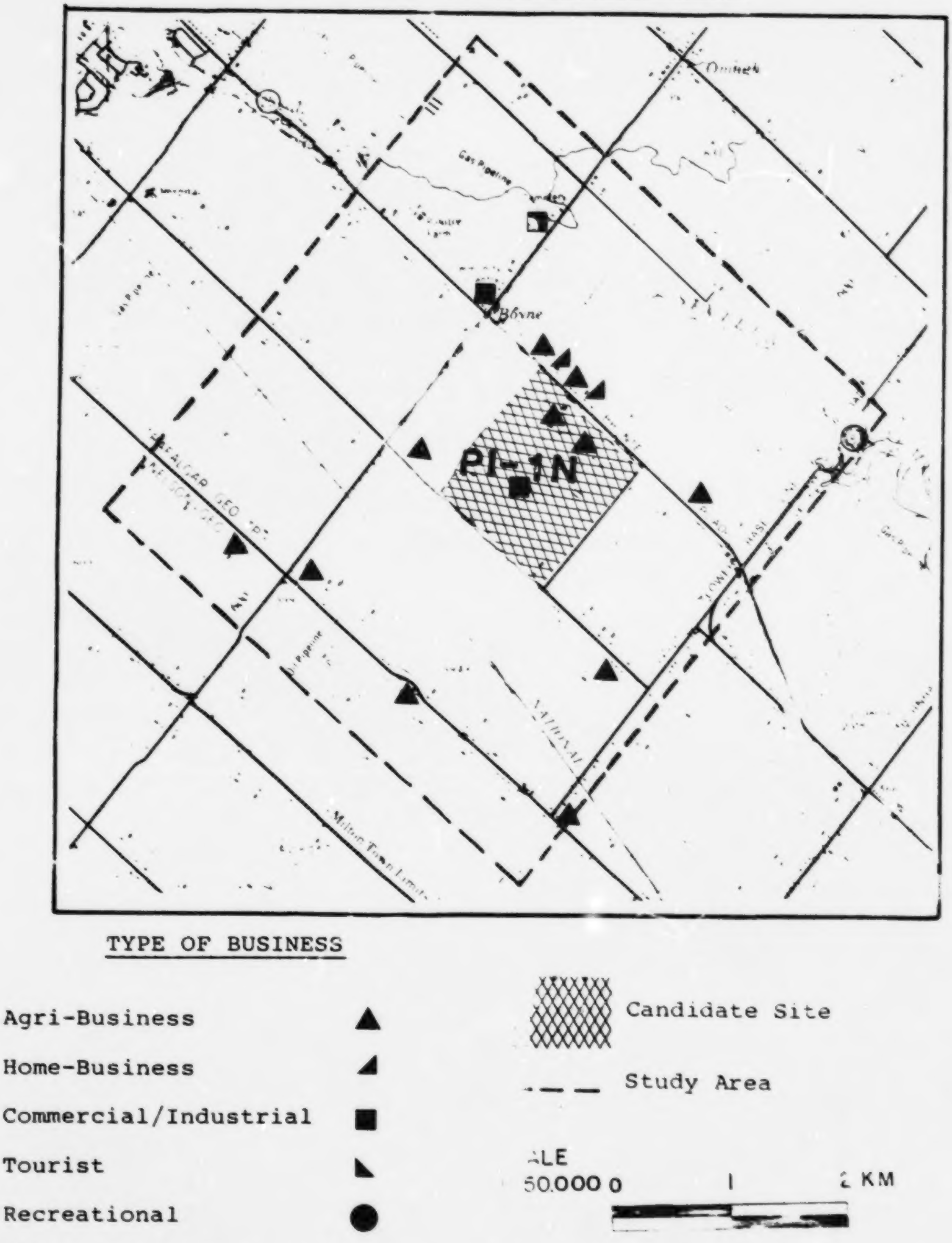
— — — Study Area

SCALE
1:50000 0 1 2 KM

Note: See text for definitions of types of business.

FIGURE B-2

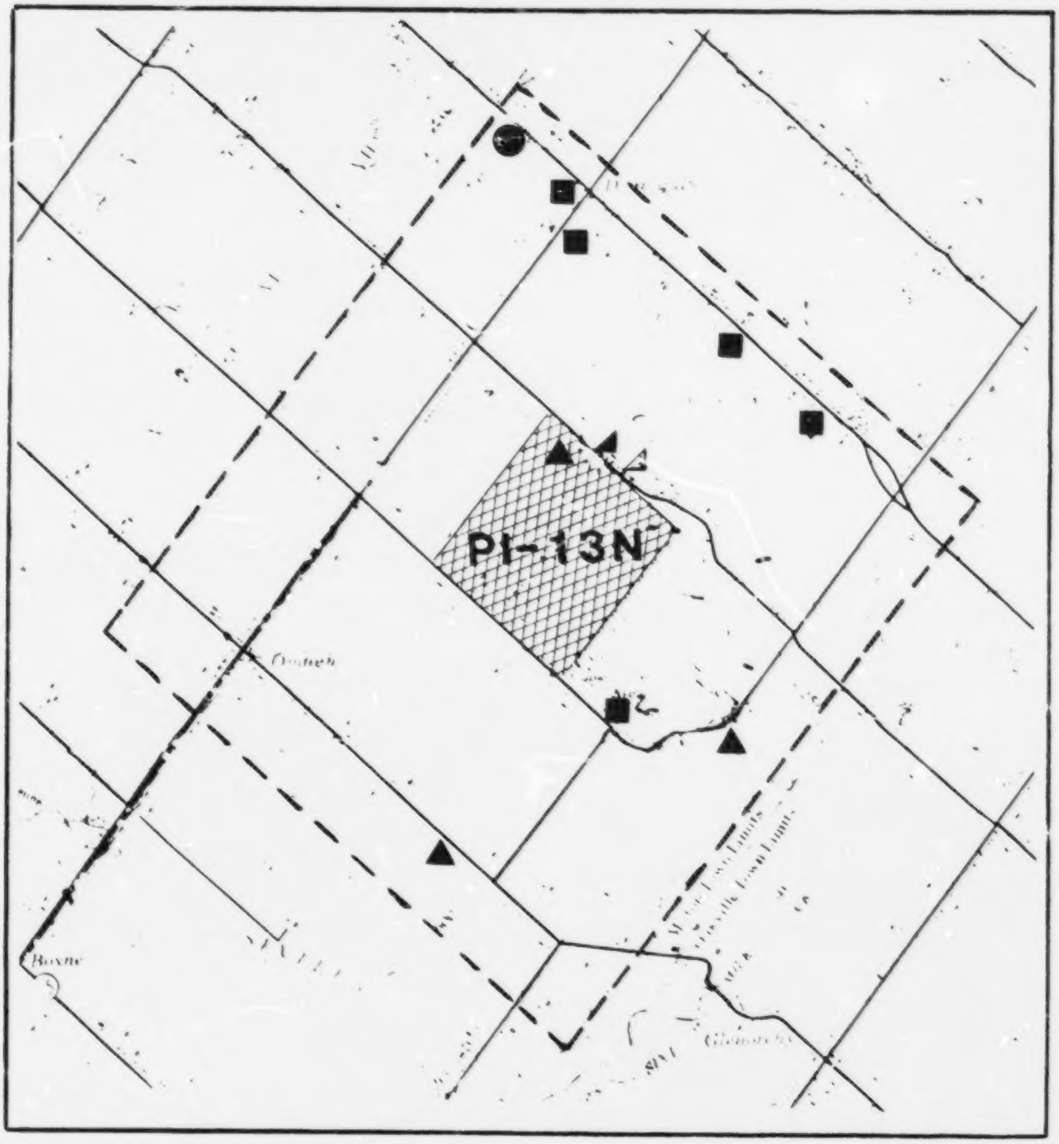
BUSINESSES ON AND IN THE VICINITY OF SITE PI-1N, MILTON, 1984


Gas Pipeline
Boyne
PI-1N
Milton Town Limits
TYPE OF BUSINESS
Agri-Business ▲
Home-Business ◢
Commercial/Industrial ■
Tourist ◣
Recreational ●
Candidate Site
Study Area
ALE
50,000 0
1
2 KM

Note: See text for definitions of types of business.

FIGURE B-3

BUSINESSES ON AND IN THE VICINITY OF SITE PI-13N, MILTON, 1984


PI-13N
Omagh
Boyne
Glenorchy

TYPE OF BUSINESS

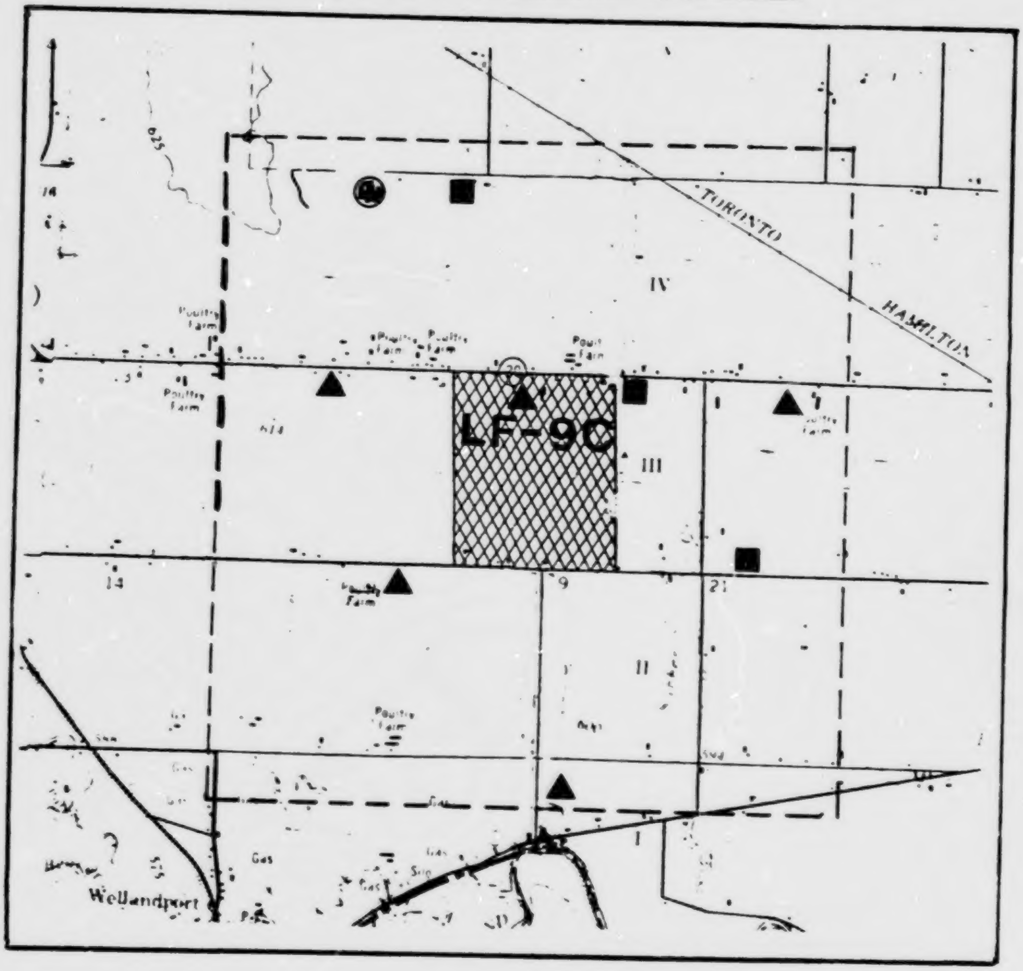
Agri-Business	▲
Home-Business	◢
Commercial/Industrial	■
Tourist	◣
Recreational	●
▨	Candidate Site
– – –	Study Area

ALE
50,000 0 1 2 KM

Note: See text for definitions of types of business.

FIGURE B-4

BUSINESSES ON AND IN THE VICINITY OF SITE LF-9C, WEST LINCOLN, 1984


625
TORONTO
HAMILTON
IV
Poultry Farm
20
LF-9C
III
614
14
9
21
II
I
Gas
Wellandport

TYPE OF BUSINESS

Agri-Business ▲

Home-Business ◢

Commercial/Industrial ■

Tourist ◣

Recreational ●

▨ Candidate Site

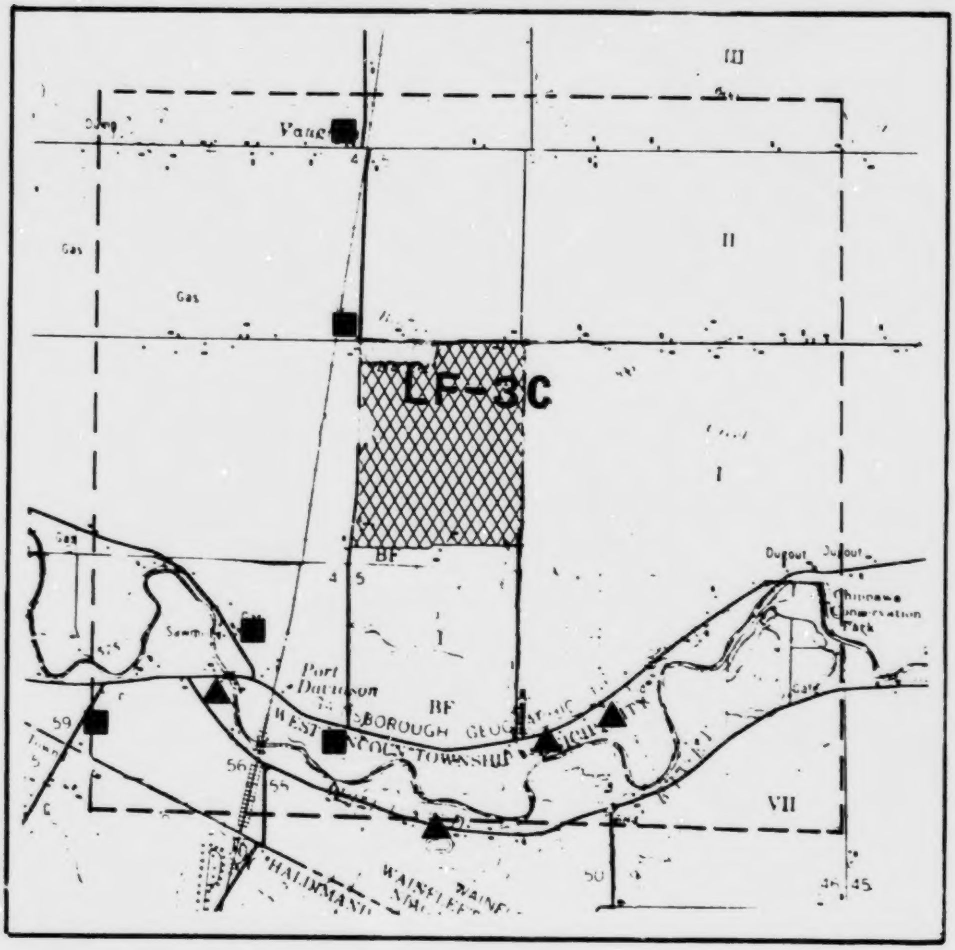
— — Study Area

CALE
50000 0 1 KM

Note: See text for definitions of types of business.

FIGURE B-5

BUSINESSES ON AND IN THE VICINITY OF SITE LF-3C, WEST LINCOLN, 1984


III
Vaug
Gas
Gas
II
LF-3C
I
BF
4 5
Gas
Dugout
Dugout
Chippewa Conservation Park
Port Davidson
BF
1
WEST LINCOLN TOWNSHIP
BOROUGH GEOGRAPHIC
59
56
55
VII
HALDIMAND
WAINFLEET
50
46 45

TYPE OF BUSINESS

Agri-Business	▲
Home-Business	◢
Commercial/Industrial	■
Tourist	◣
Recreational	●

▨ Candidate Site

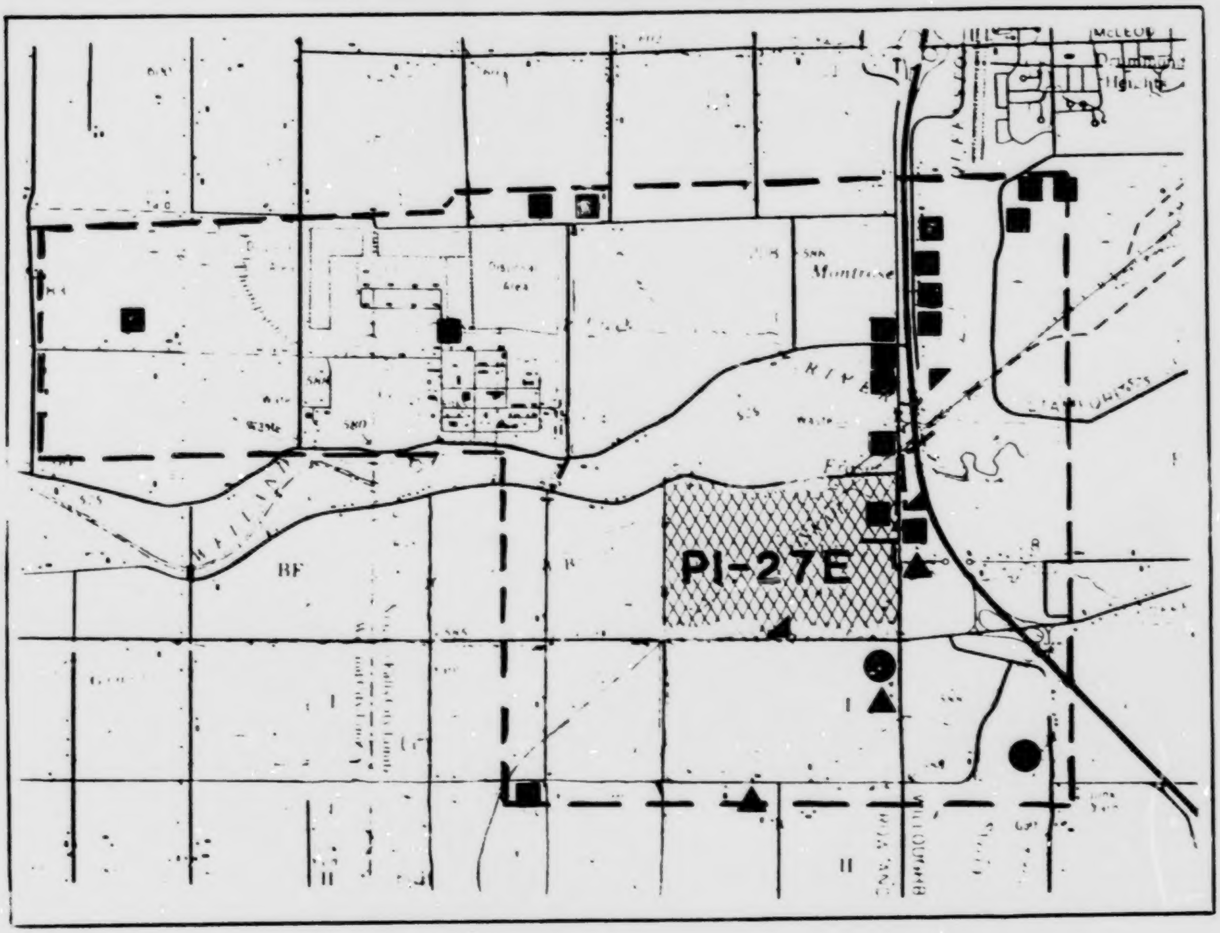
— — — Study Area

SCALE
50.000 0 1 2 KM

Note: See text for definitions of types of business.

FIGURE B-6

BUSINESSES ON AND IN THE VICINITY OF SITE PI-27E, NIAGARA FALLS, 1984


PI-27E
Montrose
McLEOD
Drummond Heights

TYPE OF BUSINESS

Agri-Business	▲
Home-Business	◢
Commercial/Industrial	■
Tourist	◣
Recreational	●

▨ Candidate Site

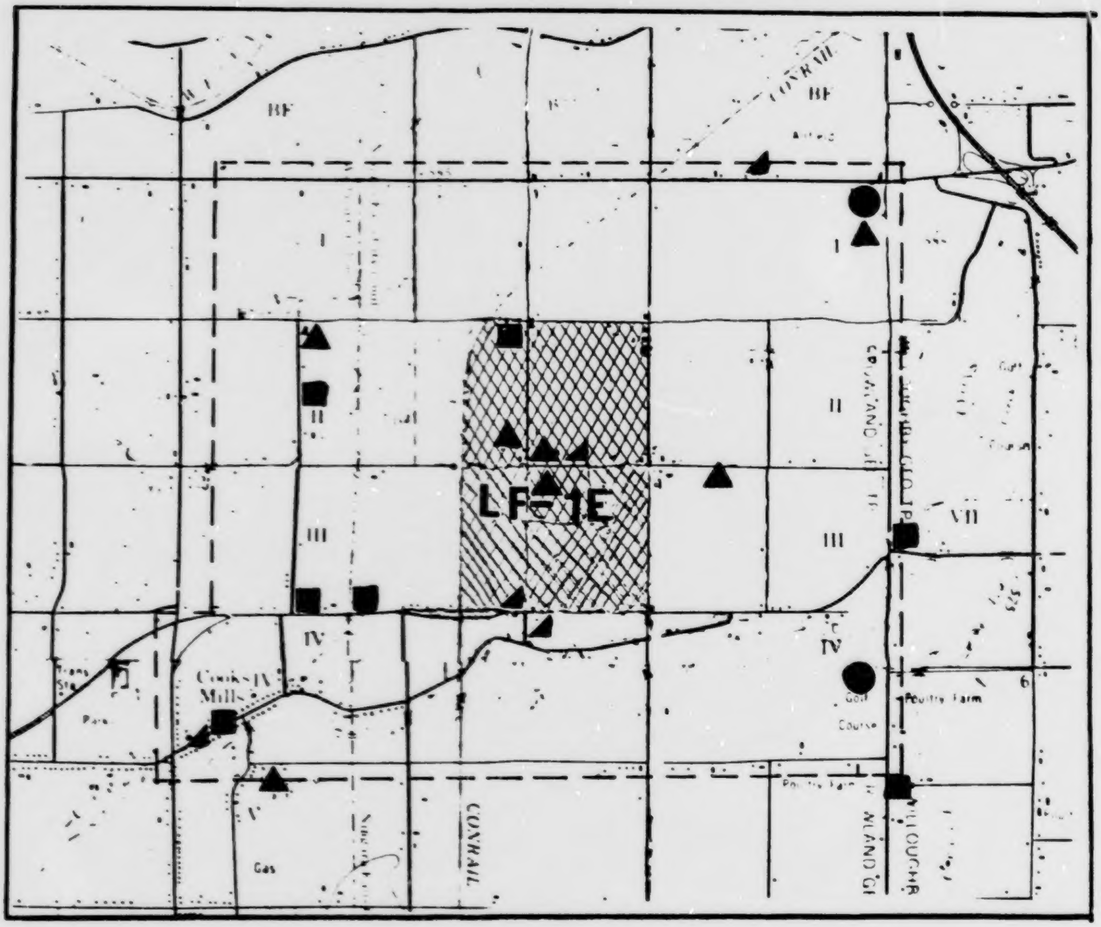
- - - Study Area

SCALE
1:50.000 0 1 2 KM

Note: See text for definitions of types of business.

FIGURE B-7

BUSINESSES ON AND IN THE VICINITY OF SITE LF-1E, NIAGARA FALLS, 1984


BF
BF
BF
CONRAIL
I
I
II
II
III
III
IV
IV
V
VII
LF-1E
Cooks Mills
Park
Golf Course
Poultry Farm
Poultry Farm
Gas
6
CONRAIL

TYPE OF BUSINESS

Agri-Business ▲

Home-Business ◢

Commercial/Industrial ■

Tourist ◣

Recreational ●

▨ Candidate Site (Integrated)

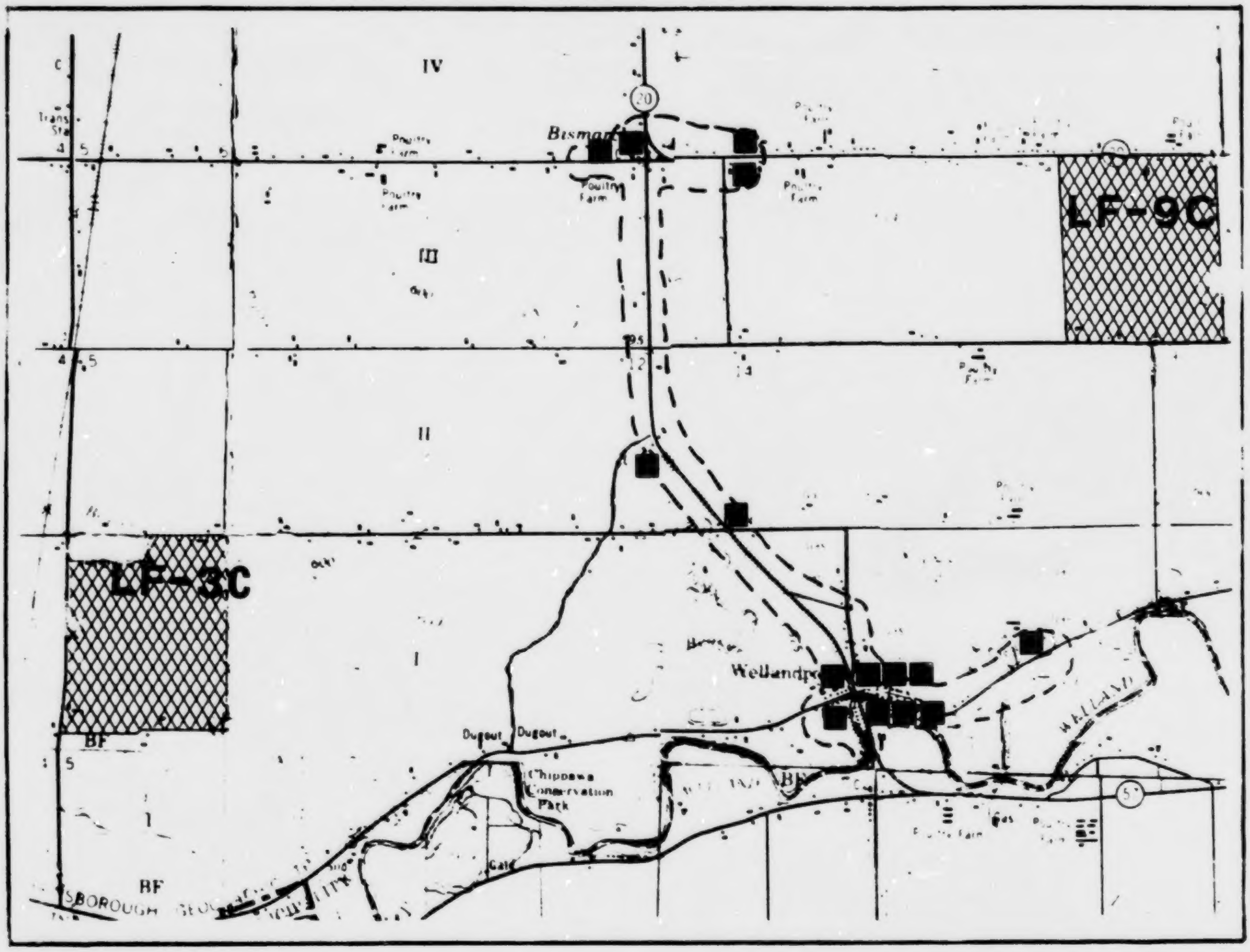
— — — Study Area

SCALE 1:50000 0 1 2 KM

Note: See text for definitions of types of business.

FIGURE B-8

BUSINESSES ON AND IN THE VICINITY
OF THE COMMUNITIES OF WELLANDPORT
AND BISMARCK, 1984


IV
20
Bismarck
Poultry Farm
LF-9C
III
II
LF-3C
I
Wellandport
Dugout
Dugout
Chippewa Conservation Park
WELLAND
BF
BF
57
Poultry Farm

TYPE OF BUSINESS

Agri-Business ▲

Home-Business ◢

Commercial/Industrial ■

Tourist ◣

Recreational ●

▨ Candidate Sites

– – – Study Area

SCALE
1:50000 0 1 2 KM

Note: See text for definitions of types of business

JM-117.1

Interview Identification Number: ________

OWMC PHASE 4A

INTERVIEW FORM

ON-SITE AND VICINITY BUSINESS CONDITIONS

THE PURPOSE OF THE INTERVIEW

The purpose for this interview is to collect information from business owners within the vicinity of OWMC's candidate sites. This information will be used to develop evaluation criteria to compare the candidate sites. In combination with other information, it will help us to eliminate unsuitable sites and select a preferred site or sites for OWMC's waste treatment facilities.

Site: ________ Date: ________________ Time: __________

Interviewer(s): ____

Respondent's Name: ____

Address: ____

____

____

Lot: ____________ Concession: ____________

Township: ______________ Telephone: __________

Property is: On Site Assessment Roll Numbers ________

Adjacent Assessment Roll Numbers ________

(INTERVIEWER NOTE: Write name of interviewee on relevant properties shown on the map.)

INTERVIEWER NOTE: The respondent should be told that this information will be used in a discreet manner. OWMC will not volunteer, disclose or attribute information of a personal, confidential or private nature; however the information might become subject to disclosure if OWMC is so ordered by the hearing officers, and may be used by OWMC for the purpose of compiling aggregated statistics and other data, the individual components of which would not be separately identified.

Also, the respondents should be told that we appreciate their cooperation and they need not feel obligated to answer all or any questions.

OWMC BUSINESS CONDITIONS SURVEY

ASK TO SPEAK TO THE PRESIDENT, MANAGER, OR OWNER (OR USE NAME FROM DIRECTORY). IF NOT AVAILABLE, ESTABLISH TIME TO PHONE BACK. TRY THREE TIMES.

Good morning/afternoon, my name is ____________ of the Clayton Research Associates Limited, Toronto. We are conducting a survey of private businesses in your area. We are interested in your opinions about the possible impact of the Ontario Waste Management Corporation on local business conditions.

1. May I ask you a few questions?

   Yes
   No (circle)

   IF NO: May I call back at a more appropriate time? (which is: ____).

   Yes
   No (circle)

   IF NO: Would you tell me why not? ______________________
   ____.

2. Have you heard about the Ontario Waste Management Corporation (or OWMC, for short?)

   Yes
   No (circle)

   IF NO, EXPLAIN: OWMC is a provincial corporation with the responsibility of constructing an industrial facility to process and dispose of liquid and hazardous industrial waste.

3. Are you aware of what OWMC is proposing near your area?

   Yes
   No (circle)

   IF YES: What facilities are they proposing? ______________
   ____(AND CORRECT, IF NECESSARY).

   IF NO, EXPLAIN.

I would like to ask you a few questions about your business, and whether you think the OWMC facilities might affect local business conditions.

4. (a) What type of business activity are you engaged in?________
____

(b) Do you have other locations?

Yes
No (circle)

(c) About how many hours a week do you spend in this activity?
____

5. (a) How many full-time employees do you have at this location at present? (A FULL TIME EMPLOYEE WORKS 30 HOURS, OR MORE, PER WEEK) _____How many of these are office positions? ___

(b) How many part-time employees do you have at present? _____ How many of these are office positions? ___________

(c) IF YES TO 4 (b) - How many full (_____) and part time (__) employees are there in the other locations?

(d) Is there any seasonal pattern to your employment?

Yes
No (circle)

IF YES PROBE: ______________________________

(e) How many of the owner's family work in your business? (_______) full time, (____) part time.

6. (a) How many years have you been operating your business in this location?______________________________

(b) When was your last plant expansion?

No Expansion
19 ________. (circle) How many employees were added in this expansion? (_____) full time, (______) part time.

(c) Do you have any plans for expansion in the future?

Yes
No (circle)

IF YES, PROBE: When might you expand? 19 _______. How many new employees might you add? _________ full time, ___________ part time.

IF NO, PROBE: What do you feel is the greatest impediment to expansion? ______________________________

(d) Do you own or rent your place of business?

Own Rent (Circle)

Now I would like to ask your opinion on the possible impact of constructing the OWMC facilities near your firm.

7. Do you expect that the new OWMC facilities will have any effect on the operation of your business?

   Yes
   No
   No opinion/Don't know (circle)

   IF YES, PROBE: How will they affect the operation of your firm? ______________________________

   (markets, clients, suppliers, noise, traffic, access, intangibles, etc.)

   Is this beneficial/detrimental to your firm?

   Beneficial
   Detrimental
   No opinion/Don't know (circle)

   Why? (PROBE) ______________________________

8. Do you see any economic benefit to your local community in general resulting from the OWMC facilities?

   Yes
   No
   No opinion/Don't know (circle)

   Why is that? (PROBE) ______________________________

9. Do you see any economic disbenefits to your local community resulting from the OWMC facilities?

   Yes
   No
   No opinion/Don't know (circle)

   Why is that? (PROBE) ______________________________

10. Have you talked to other business people in your area about the possible OWMC facilities?

    Yes
    No (circle)

    IF YES, What do they think about OWMC? ______________________________

Benefit
Disbenefits
No opinion/Don't know (circle)

Why is that? ____________________

What business are they in? ____________________

11. If the OWMC facilities were built in your community, are they likely to have an impact on your firm's future?

Yes
No
No opinion/Don't know (circle)

IF YES: In what respect? ____________________
IF YES, TO Q.10: Do other business people in your area feel the same way? ____________________

12. Are you, or any of the business people you've talked to, considering moving your location due to OWMC?

Respondent's Business	Other Businesses
Yes	Yes
No	No
Don't know (circle)	Don't know (circle)

IF YES, PROBE: Why is that? ____________________

13. Do you think your firm could profit from any opportunities that OWMC, or its associated activities, might bring?

Yes
No
No opinion/Don't know (circle)

IF YES, PROBE: How? ____________________
(sell materials to construction firms, to OWMC, hire equipment, sell to truckers, etc?)

14. In relation to the local business conditions, do you think a OWMC facility is in general good or bad for your business and your community?

Respondent's Business	Community
Good	Good
Bad	Bad
No opinion (circle)	No opinion (circle)
Other ____________	Other ____________

And why is that? ____________________

Finally, I'd like to obtain some information about yourself:

15. Your name is? ____________________

16. About how much were your gross sales last year? ____________

17. About how much in total did you pay all your employees in your business last year? ______________________

18. In which municipalities did these employees live? ______________________

19. Are you incorporated as a business? ______________________

20. The address is ______________________

21. And the telephone number is (   )- ______________.

Thank you very much for your time.

TERMINATE INTERVIEW

Time start
Time finish
Date

Signed

Supervisor - checked questionnaire   Yes/No
             checked with respondent   Yes/No

Signed:

Questionnaire number:
Municipality   :

APPENDIX C

DESCRIPTION OF PROPERTY VALUE IMPACT ESTIMATES

TABLE OF CONTENTS

Page

Purpose C-1

The Estimation of Market Value C-2

Review of Property Value Impact Literature C-7

Market Value Impact Approach C-20

Estimated Total Value of the Property Value Impacts Around the Siting Options C-28

Bibliography C-33

APPENDIX C

DESCRIPTION OF PROPERTY VALUE IMPACT ESTIMATES

PURPOSE

This appendix describes the estimation procedures utilized to derive the impacts of OWMC facilities on property values in the vicinity of each siting option.

Due to the nature of the activities to be undertaken by OWMC (the processing of special wastes), it is an assumed possibility that there could be some negative impact on property values in the vicinity of the siting options as a result of the facilities.

This appendix is divided into the five sections:

- Estimates of the market value of property in the site vicinity of each siting option are presented;
- Since no studies were encountered during the literature review regarding facilities of the type OWMC is planning, an examination of literature on relatively comparable facilities was undertaken and the findings are presented;
- Assumptions regarding the probable impact of OWMC facilities on property market values are derived from this literature review and the consultant's interpretation of the literature given the assumed characteristics of the facilities;
- These assumptions are applied to the estimates of market value to derive property value impacts in the vicinity of each siting option; and

- The final section presents a bibliography of studies that were relied upon in the above analysis.

A base case estimate of probable property value impacts (recognizing the limits of the data) is presented as is a scenario of maximum impact. The latter is used to explore the sensitivity of the base case findings to changes in key assumptions. Both scenarios relate to integrated OWMC facilities processing 300,000 tonnes of special wastes by the tenth year of operation.

THE ESTIMATION OF MARKET VALUE

METHODOLOGY

The market value of property in the vicinity of the siting options was estimated from its assessed value for municipal taxation purposes.*

DATA SOURCES

The following information sources and data were used in the calculations:

- Maps of the site vicinity. Ecologistics Limited prepared property ownership topographic maps, on a scale of 1:10,000, for an area approximately two kilometres from the centre of each candidate site. Ecologistics Limited also compiled an inventory of the ownership of each property, its area, its assessment roll number and the lot and concession number from data in the Ministry of Revenue files.

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* An alternative method, based on the employment of trained appraisers, was possible but the analysis undertaken is adequate for the comparative evaluation of siting options.

- Assessment values. Clayton Research Associates obtained the assessed value of these properties and their classification for assessment purposes (e.g., residential, farm, etc.) from the assessment rolls of the candidate municipalities.

  When the research for this analysis was conducted in 1984, the assessment rolls had been prepared in 1983 for the 1984 taxation year. In the case where a property was not listed on the assessment rolls, or where it extended partly into an adjacent municipality (such as into the City of Burlington near LF-4N or into the Town of Oakville near PI-13N), the assessed values were estimated with reference to adjacent and similar properties in the vicinity (a technique that is used in the actual establishment of assessed values). Approximately eight percent of the 830 properties on the Ecologistics Limited base maps were estimated in this manner.

  Any successful assessment appeals since the publication of the assessment rolls would not have been recorded in these rolls. However, this is not expected to have a significant impact on the assessment information since successful appeals typically are few.

- Ratio of assessed to market value. In Ontario, the level of real property assessment bears a relationship to market value in a base year. The base year, however, can differ by municipality. Because of this, each year the Ministry of Revenue calculates the overall ratio of current market value to assessed value for broad classes of property for each municipality in the province. This information is used by the

Province to equalize assessed values among area municipalities in a region in order to calculate their entitlement for provincial unconditional grants. The relationship of market value to assessed value in the candidate area municipalities was obtained from Ministry of Revenue.

TABLE C-1

RATIO OF MARKET VALUE TO ASSESSED VALUE
BY TYPE OF PROPERTY
CANDIDATE AREA MUNICIPALITIES, 1983

Area Municipality	Type of Property		
	Residential	Farm/ Vacant	Commercial/ Industrial
Milton	14.29	20.00	14.29
West Lincoln	10.00	16.67	6.25
Niagara Falls	10.00	16.67	5.88

Source: Ministry of Revenue.

In Niagara Falls and West Lincoln, the market value of all residential properties in 1983 was ten times that of their assessed value for municipal tax purposes; for Milton, the average market values of residential properties were more than 14 times their assessed value. The market value/assessment ratios were fairly close in the three area municipalities for farm properties but were quite different for commercial/ industrial property in the Town of Milton.

ESTIMATE OF MARKET VALUE

The market value of property in the vicinity of the candidate sites was estimated in the following manner:

- A 1,500 metre impact zone was identified. The review of the impact literature showed that most property impacts occurred well within one mile (1,600 metres) of the source of interference.*

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* This literature is summarized in the final section of this appendix.

- Three 500 metre zones were delineated. The 1,500 metre impact zone was divided into three concentric zones in order to allow for the fact that impacts appear to vary with distance from the source of the interference. When a property extended beyond one zonal limit, the assessed value was apportioned in relation to the area within each zone (for instance, if a property was situated half in the zero to 500 metre zone and half in the 501 metre to 1,000 metre zone, then half the value was allocated to each zone).

  A larger site (e.g., the 273 hectare integrated site LF-1E) has a larger 500 metre concentric zone surrounding it than a smaller site (e.g., the 135 hectare integrated site LF-9C).

- Properties in each of the three zones were distinguished by type. Since the literature on property value impacts shows differing impacts for residential, farm and business (commercial/industrial) properties, the assessment data for each zone were divided into these categories.*

  The assessed value of property in the vicinity of the candidate sites and siting options is shown in Table C-2 by 500 metre zones and property type. For the two siting options where the zones around the candidate sites overlap, LF-4N and PI-1N in Milton and LF-1E and PI-27E in Niagara Falls, any double counting was eliminated from the total assessed value of property in each zone.

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* The definition of a business in this appendix differs from that of Appendix B in that agri-businesses are included with farm assessment and home-businesses are included with residential assessment.

TABLE C-2

ASSESSED VALUE OF PROPERTY IN THE VICINITY OF CANDIDATE SITES AND SITING OPTIONS BY TYPE OF PROPERTY, 1983 ($000)

Candidate Site	Residential Properties* 0-500 Metre Zone	Residential Properties* 501-1,000 Metre Zone	Residential Properties* 1,001-1,500 Metre Zone	Farm/Vacant Properties* 0-500 Metre Zone	Farm/Vacant Properties* 501-1,000 Metre Zone	Farm/Vacant Properties* 1,001-1,500 Metre Zone	Commercial/Industrial Properties* 0-500 Metre Zone	Commercial/Industrial Properties* 501-1,000 Metre Zone	Commercial/Industrial Properties* 1,001-1,500 Metre Zone
LF-4N	9.3	9.7	51.5	98.2	117.7	151.4	0.0	0.0	0.0
PI-1N	41.2	44.7	143.7	108.6	143.5	180.5	0.0	6.9	0.0
PI-13N	94.9	136.1	239.7	101.2	187.6	225.9	0.0	0.0	2.7
LF-9C	11.5	21.0	15.2	58.3	135.6	125.3	6.3	0.0	0.0
LF-3C	9.8	21.5	36.7	65.7	102.3	167.9	0.0	0.0	10.1
PI-27E	43.9	52.5	85.0	90.7	133.4	135.4	872.7	296.5	810.6
LF-1E	59.9	77.3	165.9	89.2	111.9	145.8	0.0	11.2	16.4
Siting Options**									
LF-3C	9.8	21.5	36.7	65.7	102.3	167.9	0.0	0.0	10.1
LF-9C	11.5	21.0	15.2	58.3	135.6	125.3	6.3	0.0	0.0
LF-1E	59.9	77.3	165.9	89.2	111.9	145.8	0.0	11.2	16.4
LF-1E/PI-27E***	43.9	121.7	219.1	137.1	226.4	220.9	872.7	306.2	810.8
LF-4N/PI-1N	50.5	54.3	170.8	206.8	258.0	272.4	0.0	6.9	0.0
LF-4N/PI-13N	104.2	145.7	291.2	199.4	305.3	377.3	0.0	0.0	2.7

* Residential includes houses on lots of 0.8 hectares or less. Farm includes farms and institutional properties (church, cemetery or school). Commercial and industrial includes tourist and recreational businesses.

** Some properties are included in more than one candidate site. The assessed values for these properties have been noted and deleted to avoid double counting.

***The zones for integrated LF-1E are larger than for partially integrated LF-1E.

Source: Municipal Assessment Rolls.

- The assessed values in each zone were multiplied by the ratio of market to assessed value to derive an estimate of actual market value. The assessed values shown in Table C-2 were multiplied by the ratios of market value to assessed value shown in Table C-1. The resulting estimate of the market value of property by candidate site and siting option is contained in Table C-3. These estimates are expressed in terms of 1983 dollars.

REVIEW OF PROPERTY VALUE IMPACT LITERATURE

SELECTION OF COMPARABLE FACILITIES

The estimates of the impact of OWMC facilities on property values in the vicinity of the siting options were based on a detailed examination of the literature dealing with the impacts of potentially objectionable facilities on nearby properties.

As no study was encountered which dealt specifically with the effect of facilities similar to those planned to by OWMC, the literature review concentrated on collecting information on the effect of facilities that could serve as proxies for the process components of OWMC facilities.

These proxies can be divided into three general categories:

- The effect of constructing potentially objectionable facilities that "intrude" into an area. The impact of a new, potentially objectionable facility is a common theme in the literature on property value impacts. Examples of this type of facility which are relevant to the OWMC situation include:

TABLE C-3

MARKET VALUE OF PROPERTY IN THE VICINITY OF CANDIDATE SITES AND SITING OPTIONS BY TYPE OF PROPERTY, 1983 ($000)

Candidate Site	Residential Properties*			Farm/Vacant Properties*			Commercial/Industrial Properties*			Total All Properties**
	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	
LF-4N	133.1	137.2	736.2	1,963.2	2,353.7	3,026.1	0.0	0.0	0.0	8,349.5
PI-1N	589.0	638.5	2,053.5	2,172.8	2,870.0	3,609.8	0.0	98.3	0.0	12,031.9
PI-13N	1,355.2	1,943.6	3,423.7	2,024.7	3,752.5	4,518.9	0.0	0.0	37.9	17,056.5
LF-9C	115.5	210.1	152.5	972.4	2,259.3	2,088.5	39.5	0.0	0.0	5,837.8
LF-3C	98.1	214.8	366.8	1,095.0	1,704.6	2,747.5	0.0	0.0	63.3	6,340.1
PI-27E	438.8	557.5	850.0	1,512.4	2,223.1	2,257.4	5,133.5	1,744.4	4,768.0	19,485.1
LF-1E	599.5	772.8	1,658.9	1,487.3	1,865.1	2,430.4	0.0	65.9	96.3	8,976.2
Siting Options***										
LF-3C	98.1	214.8	366.8	1,095.0	1,704.6	2,797.5	0.0	0.0	63.3	6,340.1
LF-9C	115.5	210.1	152.5	972.4	2,259.3	2,088.5	39.5	0.0	0.0	5,837.8
LF-1E	599.5	772.8	1,658.9	1,487.3	1,865.1	2,430.4	0.0	65.9	96.3	8,976.2
LF-1E/PI-27E****	438.8	1,250.3	1,369.0	2,284.2	3,544.2	4,673.9	5,133.5	1,801.2	4,769.6	25,264.7
LF-4N/PI-1N	722.1	775.7	2,440.6	4,136.0	5,159.7	5,448.7	0.0	98.3	0.0	18,780.6
LF-4N/PI-13N	1,488.3	2,080.8	4,159.8	3,987.9	6,106.2	7,545.0	0.0	0.0	37.9	25,405.9

* Residential includes houses on lots of 0.8 hectares or less. Farm includes farms and institutional properties (church, cemetery or school). Commercial and industrial includes tourist and recreational businesses.

** Totals may not add due to rounding.

*** Some properties are included in more than one candidate site. The market values for these properties have been noted and deleted to avoid double counting.

****The zones for integrated LF-1E are larger than for partially integrated LF-1E.

Source: Tables C-1 and C-2.

- The construction of municipal sanitary landfill sites. Since OWMC is planning to construct an engineered landfill, the experience of impacts around municipal landfill sites is one of the closest analogies in the literature to this component of the facilities.*

- The effect of nuclear or coal fired power stations on adjacent areas. Since the incident at Three Mile Island at Harrisburg, Pennsylvania in March, 1979, there has been considerable attention focussed on the impact on adjacent property values of facilities handling potentially dangerous materials. Concern has also been expressed over the negative impacts of older, more pollution-prone coal fired stations. This literature is relevant to OWMC facilities due to the hazardous materials it will process and because, like these power stations, OWMC facilities will be visible over a wide area.

- The impact in rural areas of potentially objectionable industries. These examples are relevant to OWMC's situation as six of the seven candidate sites are located in rural areas. The examples in the literature review relate to the impact of Ontario Hydro's heavy water plants (which have an unpleasant by-product, hydrogen sulphide gas) in rural Bruce Township and the impact of aggregates mining in rural areas, which creates noise and truck traffic.

- The impact of power transmission lines on adjacent properties. The effects of constructing a highly visible transmission line on the property values of adjacent farms and rural residential properties has been the subject of a number of reports. The impact of constructing transmission lines is similar to the impact of OWMC facilities on property values in that the powerlines are an intrusion into the rural environment.

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* The recurrent problems around municipal landfills of unsightliness, smells and leachate (which contribute to property value impacts) should not be a problem around the OWMC site, however.

- Contamination created by potentially objectionable facilities. There is an extensive literature on the impact of clearly identifiable sources of contaminants on adjacent properties. The examples judged to be the most relevant to OWMC facilities include the following:

  - The effects of air pollution on property values. Since OWMC facilities will have an incinerator and a visible 100 metre stack, there will likely be some concern from adjacent residents and farmers about the escape of pollutants. With a partial evaporation process, OWMC facilities will have two stacks, which could increase the concern of adjacent residents and farmers.

  - The effect of Urea Formaldehyde Foam Insulation (UFFI) on property values. The presence of a suspected carcinogen, UFFI, has affected property values in houses where this insulation has been installed. The UFFI example is different from the impact of OWMC facilities in that UFFI only affects the property values where it has been installed and not adjacent properties. As such, it is not as relevant as some of the other impact examples; but it could be used as an upper limit of negative property value impacts.

  - The impact of radioactive wastes on property values. The OWMC facilities specifically exclude the processing of radioactive wastes. The actual presence of known hazardous materials might, however, set an upper limit for an estimate of impact.

- The effect of noise on adjacent properties. There is a considerable body of literature that investigates the effects of noise on adjacent property values. The incinerator at OWMC facilities will operate 24 hours a day and, although an extensive 400 metre buffer zone will surround the incinerator, the landfilling activity in the buffer zone is expected to raise the ambient noise level for adjacent properties.* In addition, waste generators from all parts of Ontario will be sending material to the facilities and this truck traffic will be evident on the facilities access roads.**

  The literature search regarding noise impacts on property values included the following subjects:

  - the effects of airport noise on the property values of surrounding communities;
  - the effects of road traffic noise on adjacent property values; and
  - the effects of railway noise on property values in the vicinity.

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* The number of residents in these noise zones is considered in a factor examined by the Institute of Environmental Research (i.e., use and enjoyment of property).

** OWMC facilities with a processing capacity of 150,000 tonnes would generate at least 180 trucks per day. See Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985. Facilities with a processing capacity of 300,000 tonnes would, of course, generate more truck traffic.

SYNOPSIS OF THE LITERATURE REVIEW REGARDING RELATIVELY COMPARABLE FACILITIES

The literature review

Tables C-4 and C-5 summarize the overall results of the literature review of the impacts of these relatively comparable facilities on both market values and assessed values of property.*

While an attempt was made to focus on market value impact experience in Ontario, many studies relate to other provinces and to experience elsewhere, primarily the United States. The assessed value impacts, however, relate solely to Ontario. When market values are impacted, an Ontario property owner can appeal for an assessement reduction to the extent of the demonstrated impact.

The maximum and minimum impacts encountered in the literature review are shown in Tables C-4 and C-5 by type of impact and type of property. In the 80 studies analyzed, only two noted possible impacts on commercial properties in the vicinity of the source of the impact and there was one brief reference to industrial parks. The literature showed that a negative impact on most industrial properties is unlikely. The majority of the reports (67) included information on the possible impacts on residential property values while 21 studies examined impacts on farm property values.**

The largest number of reports encountered on market value impacts related to facility intrusions and noise impacts (24 each). The largest number of case studies on assessed value impacts related to facility intrusions (9).

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* Some studies examined impacts on market values, others examined impacts on assessed values.

** There is a slight overlap in the numerical count of these reports.

TABLE C-4

SYNOPSIS OF THE LITERATURE REVIEW ON MARKET VALUE IMPACTS MINIMUM AND MAXIMUM IMPACTS ENCOUNTERED IN THE LITERATURE

Nature of Impact	Number of Studies	Residential Properties		Farm Properties	
		Minimum	Maximum	Minimum	Maximum
		Percent			
Facility Instrusion	24				
Sanitary Landfill	12	zero	-46	zero	-20
Nuclear/Coal Power Station	6	positive	-16		
Noxious Industry in Rural Area	2	positive	some decline		zero
Hydro Transmission Line	4	zero	-25		zero
Contamination	11				
Air Pollution	4	zero	-10		
UFFI Foam	5	zero	-35		
Radioactive Wastes	2	zero	-20		
Noise	24				
Airport	10	positive	-15		
Road	13	positive	-9		
Railway	1		-10		

Source: Appendix C, Bibliography.

TABLE C-5

SYNOPSIS OF THE LITERATURE REVIEW ON ASSESSED VALUE IMPACTS MINIMUM AND MAXIMUM IMPACTS ENCOUNTERED IN THE ONTARIO LITERATURE

Nature of Impact	Number of Studies	Residential Properties Minimum	Residential Properties Maximum	Farm Properties Minimum	Farm Properties Maximum
		Percent			
Facility Instrusion	9				
Sanitary Landfill	8	zero	-33	zero	-10
Hydro Transmission Line	1		-15		
Contamination	8				
UFFI Foam	5	zero	-35		
Radioactive Wastes	3	zero	-98		
Noise	4				
Airport	2		0		
Road	1		-2		
Railway	1		-6		

Source: Appendix C, Bibliography.

Overview of the findings

The following general findings relate to the property value impacts around the relatively comparable facilities shown on Tables C-4 and C-5.

Mostly negative impacts. In approximately two-thirds of the studies, these relatively comparable facilities caused negative property value impacts in their vicinity. Only about five percent of the studies identified positive property value impacts. These positive impacts were generally related to increased employment generated by the potentially objectionable facility or, notably in the noise studies, by the improved accessibility brought about by a new road or airport.

About 30 percent of the studies were not able to establish a link between the potentially objectionable facility and a change in market or assessed values.

Impact by type of property. Residential properties appear more susceptible to negative property value impacts than farm properties. For both the market value and assessed value impact studies, residential properties consistently register larger negative impacts for all types of potentially objectionable facilities (see Tables C-4 and C-5). Commercial properties may be impacted by potentially objectionable facilities, but no examples of negative impacts on adjacent industrial facilities were encountered in the literature. One source considered that a negative impact on existing heavy industry was unlikely (McKechnie et al, 1983).

Range of impacts. There is a considerable range of impacts presented in Tables C-4 and C-5. Many of the impacts noted in the literature are site specific and these impacts can vary significantly between two adjacent properties. For residential properties encircling a Hamilton-Wentworth sanitary landfill, for instance, impacts ranged from a decrease of 39 percent of market value for a property located on a truck access route, to a 15 percent decrease (for a property surrounded on three sides by the landfill), to a four percent decrease and a slight increase in market value for two adjacent properties not located on the truck access routes (Chambers and Company, 1983).

Impacts by type of facility. The highest negative market value impacts encountered in the literature concern properties affected by truck traffic to sanitary landfills: the market value of residential properties adjacent to the Region of Peel's sanitary landfill fell 46 percent (Sargeant, 1983); while farm values fell by 20 percent near a Harwich landfill (Brisco Real Estate, 1981). The highest assessment reduction, 98 percent, occurred for Scarborough houses built over radioactive material; market value impact was a drop of between 10 to 20 percent, however (Ontario Municipal Board: Scarborough, 1983). Until the removal of the contaminated soil, and the subsequent reestablishment of the market for these houses, the Ontario Municipal Board decided that a major assessment reduction was appropriate. For houses adjacent to this radioactive contamination, however, no property value impacts occurred.

By type of facility, highlights of the market and assessed value impacts shown on Tables C-4 and C-5 are as follows:

Intrusive facilities

- Some sanitary landfills have not had "a measurable impact on local property values" (McKechnie et al, 1983, page 73; New Brunswick, 1982).

- The highest impact around a nuclear station, Three Mile Island, was a perceived 16 percent decrease in the value of homes. Later studies of actual house sales refuted the assertion that any impact had occurred (Webb, 1980; Nelson, 1981; Gamble, 1982).

- The construction of the Ontario Hydro heavy water plants did not create negative property impacts in the Bruce Peninsula. The demand for properties grew at the same time as the plants opened due to the new workers at the plant (Ontario Hydro, 1975).

- The mining of aggregates and the presence of pits and quarries tend to reduce property values in the vicinity of these operations (McLellan, 1983).

- The highest impacts of power transmission lines, a 25 percent decrease in market values, occurred when they were located close to rural estate lot residential subdivisions (Boyer, 1978).

Contamination

- In a specific example of air pollution in St. Louis, Missouri, a maximum property value impact of ten percent was identified. However a study of 85 cities in the United States failed to identify a clear link between the level of pollutants and residential property values (Smith et al, 1975; Nourse, 1967).

- When the presence of UFFI was known to a purchaser of a house, an average 35 percent decrease in both market and assessed value occurred in the Province of Ontario (Ontario Municipal Board: Kitchener, Waterloo, 1983; Toronto, 1984).

- The presence of radioactive wastes resulted in negative property value impacts in Port Hope and Scarborough (Redmond, 1983).

Noise

- Maximum residential property market value declines in the noise studies ranged from 9 to 15 percent (Mieszkowski, 1978; Emerson, 1972). At times, the positive effects of improved accessibility outweigh the negative effects of noise. Only minimal assessment reductions have been allowed for noise impacts in Ontario and no assessment reductions were allowed for noise originating from the Windsor airport (Ontario Municipal Board: Windsor, 1978).

Methodological issues

There is a lack of consensus in the literature on the methodology used to analyze impacts and on the conclusions that result from the analyses. A number of considerations emerge from the methodologies utilized in the studies in the literature review that are relevant for the current situation:

Impacts are studied after the fact. The aim of Phase 4A of the site selection process is quite different than the aim of most of the literature since the goal is to forecast the possible impacts before construction of OWMC facilities rather than measure the impacts after the facilities are built. Without any studies of the impact of special wastes processing facilities on adjacent property values, proxies for OWMC process components have been selected as guides for the analysis.

Impacts are studied from an imperfect data base. Most of the impact studies compare the observed effects in a control zone, away from the suspected impacts, with the trends encountered in the area adjacent to the identified intrusion. One of the difficulties with this theoretically adequate approach is that the data are imperfect. In the impact literature, property values are derived from actual sales, estimates by appraisers, assessment values and residents' subjective opinions of their property valuation in surveys such as a national census.

Whereas actual sales are the best and most reliable source of property value impacts, there are usually few sales in any one year both near the potentially objectionable facility and in the control zone. In the study of the impact of heavy water plants in the Bruce Peninsula, for instance, there were no sales in some years on which to make direct comparisons (Ontario Hydro, 1975, page 31). The limitation of appraisal reports is that they may be subjective and are not based on actual market transactions. In a case near the Hamilton-Wentworth sanitary landfill, one appraiser calculated a 2.5 percent negative impact while another appraiser identified a 39 percent negative impact for the same property (Chambers and Company, 1983; Sargeant, 1983). Assessment values are only relevant if there is current market value assessment, with reassessment on a relatively regular basis. The disadvantages of a property owner's assessment in a census is that it is highly subjective and censuses are completed infrequently (once every five or ten years).

An advantage of using census or assessment data in impact studies is that a sufficient amount of data can be obtained on which statistical techniques can be applied. With actual sales or appraisers' reports, the number of transactions is significantly reduced, and the level of statistical confidence in the results may also fall.

A direct, causal link between a potentially objectionable facility and property value impacts is difficult to establish. A characteristic of the market for land is that it is influenced by many factors, from the general economy to site specific factors. It is also influenced by people's changing perceptions and expectations. As a result, many studies have found difficulty in establishing an unambiguous link between property value impacts and their causes. There is some doubt that this can be accomplished readily (Woods Gordon, 1981).

Circumstances differ between impact situations. It is generally difficult to apply findings from one study to another due to differences in the institutional structure, market demand and supply and the geography of the various case studies under investigation. Indeed, the Hamilton-Wentworth sanitary landfill, which was regarded in as an exemplary example of an operation (New Brunswick, 1982), was the subject of a compensation hearing for property impacts the next year (Ontario Municipal Board: Hamilton-Wentworth, 1984).

MARKET VALUE IMPACT APPROACH

THE ASSUMPTIONS

Based on the above literature review, and on a consideration of the nature of properties in the vicinity of OWMC siting options, the following assumptions are applied to each siting option to estimate the property value impact of OWMC facilities with an annual processing capacity of 300,000 tonnes in their tenth year of operation:

- Negative property value impacts on residential, farm and business properties will occur around OWMC facilities.

- Whereas both positive and negative impacts are possible, for the purpose of the comparative evaluation, it is assumed that impacts will not occur on businesses that stand to profit from the arrival of OWMC facilities nor on those not affected by its operation.

TABLE C-6

ASSUMED PROPERTY VALUE IMPACTS, PERCENT

	Type of Property		
Impact Zone	Residential	Farm/ Vacant	Commercial/ Industrial*
Base Case Scenario			
0-500 metres	-16.00	-15.00	-10.00
501-1,000 metres	-8.00	-7.50	-5.00
1,001-1,500 metres	-4.00	-3.75	-2.50
1,500+ metres	0.00	0.00	0.00
Maximum Impact Scenario			
0-500 metres	-46.00	-20.00	-20.00
501-1,000 metres	-23.00	-10.00	-10.00
1,000-1,500 metres	-11.50	-5.00	-5.00
1,500+ metres	0.00	0.00	0.00

* Only businesses negatively affected.

- Negative property value impacts will be limited to a 1,500 metre radius around the candidate siting options.

- For the 500 metre impact zone adjacent to the siting option, an average negative impact on residential property of 16 percent is assumed. An average negative impact of 15 percent is assumed for farm and ten percent for commercial and industrial properties.

- The above impacts are assumed to halve in each of the subsequent 500 metre impact zones away from the siting option.

- Whereas impacts are typically highest in the early years of construction, and tend to ameliorate afterwards, no allowance has been made for any recovery in value over time.

The rationale and the basis for these assumptions is provided in the next section.

RATIONALE FOR THE ASSUMPTIONS

Negative impacts

In the literature review, two-thirds of the impacts around potentially objectional facilities that were relatively comparable to those OWMC is planning to construct were negative. On this basis, it is reasonable to assume that OWMC facilities will have a negative impact on market values in their vicinity.

Selective business impacts

In the 80 studies reviewed, only two referred to possible impacts on commercial properties and one mentioned industrial properties:

- A study on sanitary landfills stated that it was unlikely that existing heavy industry would be significantly affected by the construction and operation of a landfill. However, a commercial business might be affected (McKechnie et al, 1983); and
- While railway noise impacts on commercial businesses were not specifically considered in a London, Ontario study, the author expected these impacts to be much lower than those on residential properties (Ploon, 1978).

If there had been significant impacts on commercial and industrial properties, it is reasonable to assume that some of the studies in the literature review would have noted them. It is assumed, therefore, that only the properties of the businesses identified in Appendix B as being negatively affected by the presence of OWMC facilities will be impacted by the waste treatment facilities. For businesses either positively affected or not affected at all, no property value impacts are assumed.

A 1,500 metre limit

Since the majority of the impacts encountered in the literature occurred within 1,500 metres of the source of the identified interference, a 1,500 metre zone was accepted as an appropriate limit for the analysis of negative property value impacts of OWMC facilities. The limits of the impacts noted in studies of the literature review were as follows:

- When an impact area, up to five miles (8,000 metres) from the site of the Bruce Nuclear Power Station and its heavy water plants, was compared to the control area in the remainder of rural Bruce Township, no property value impacts were identified (Ontario Hydro, 1975).

- Residents within two miles (3,200 metres) of Three Mile Island were concerned that the nuclear accident would devalue their properties. The concern was particularly strong for people who could see the power station from their homes. Two subsequent studies of house sales proved these fears to be groundless (Webb, 1980; Nelson, 1981; Gamble, 1982).

- After one mile (1,600 metres), the negative impacts of noise around a major airport in Dallas, Texas were replaced by the positive effects of accessibility to this source of employment (Devany, 1976).

- Between one mile (1,600 metres) of the Hamilton-Wentworth sanitary landfill, no negative property value impacts were determined. However, at a 500 metre distance from the site, a significant 39 percent negative property value impact was identified on a new access route for the garbage trucks (Ontario Municipal Board: Hamilton-Wentworth, 1984).

- A distance of 800 metres was accepted as the limit for property value impacts in a Region of Halton study around proposed sanitary landfill sites (Region of Halton, 1985).

- No negative property value impacts were identified in an 800 metre zone around a Thunder Bay sanitary landfill for houses constructed after the landfill began operating (Appraisal (Fredericton) Limited, 1984).

- No property value impacts were encountered in a 300 metre zone of a sanitary landfill in the City of Winnipeg nor in a 300 metre zone near a sanitary landfill in the Niagara Peninsula (McKechnie et al, 1983; Ontario Municipal Board: Mono Township, 1979).

- No property value impacts were encountered within 275 metres of a St. Catharines sanitary landfill (Ontario Municipal Board: St. Catharines, 1972).

- A distance of 260 metres marked the limit of railway noise impact on adjacent properties in London, Ontario (Ploon, 1978).

Based on the above evidence of the impact of potentially objectional facilities, it appears to be a reasonable assumption to select a 1,500 metre zone by which to limit the estimate of property value impacts for comparative purposes.

Basis for assumed impacts

The rationale for the specific assumed property value impacts of OWMC facilities (presented in Table C-6) is as follows:

- For residential and farm properties, these impacts represent the upper quartile of all devaluations in the relevant literature discussed in the previous section. Whereas higher impacts have been identified in clear cases of contamination, or extreme site specific impacts, it was concluded that the likely impacts around OWMC facilities would not be as severe as the highest impacts identified in the literature due to OWMC's commitment to use the best available technologies.*

- There was no precise data on commercial and industrial impacts in the literature that was reviewed. For those businesses negatively affected by the presence of OWMC facilities, an impact identical to that of farmland is assumed. There are only seven of these businesses in all impact zones around the candidate siting options. The remaining buinesses are agribusinesses (which are included in the farm values) and home-businesses (which are included in the residential values).

For the maximum negative property value impact scenario (to be used as a sensitivity test), the highest market value impacts encountered in the literature were applied in the 500 metre zone: a 46 percent impact on residential properties and a 20 percent impact on farm properties (see Table C-6). The commercial and industrial impact for businesses negatively affected by the presence of OWMC facilities was again assumed to be identical to the farm impact.

Impacts decrease with distance from the facility

The literature review shows that the effect of property value impacts diminish with increasing distance from the source of the annoyance. The following references are relevant:

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* OWMC is committed to using the best available technologies and only those technologies which have been successfully demonstrated (proven) in commercial applications. See Monenco Limited, Facility Design, 1985.

- Negative impacts on home values decline with distance from a North Chicago power station (Blomquist, 1975).

- For each decibel decrease in noise away from six United States airports, negative impacts on home values decrease (Nelson, 1979).

- A house 30 metres from a railway sells for ten percent less than an identical one 240 metres distant (Ploon, 1979).

- Townhouses near an expressway in Mississauga sell for between seven to 29 percent less than identical townhouses at a greater distance (Hall et al, 1977).

- Houses located adjacent to Highway 401 in Etobicoke sell for five to six percent less than for similar houses in a control area situated away from the highway (Ontario Ministry of Transportation, 1976).

- Houses near a plant that emitted choking gases sold for up to eight percent less than those in neighbourhoods further removed from the source of the air pollution (Nourse, 1967).

As the literature review did not produce a consistent guideline for the decrease in property values with distance from the potentially objectional facility, it was assumed (based on the available evidence) that the impacts applied to the 500 metre zone would be halved for the 501 to 1,000 metre zone and halved again in the 1,001 metre to 1,500 metre zone. For instance, a residential impact in the 500 metre zone of 16 percent, is assumed to drop to eight percent in the next zone and to four percent in the third zone, 1,001 metres to 1,500 metres (see Table C-6).

No allowance made for any recovery in value over time

Property values tend to recover to varying degrees within a few years after a potentially objectional facility is constructed:

- In a Windsor sanitary landfill case, the Divisional Court of Ontario found that "as the imminence of the construction came closer, the values of property went down reaching its optimum during the actual construction" (Ontario Municipal Board: Hamilton-Wentworth, 1984).
- The housing market around four nuclear power stations deteriorated at the announcement of their construction and revived notably after they began operating (Gamble et al, 1980).
- Property values tend to recover after "shock periods" around airports (when new technology is introduced or when a new runway is constructed, for instance), partly because people who are sensitive to noise move out and those who are indifferent to noise move in, to change the "econoscape" around the facility (Beattie, 1983).
- Complaints about the effects of power transmission lines decrease considerably after construction as perceptions about the power lines tend to improve with time (Boyer, 1978).
- The rehabilitation of sanitary landfill sites restores property values in their vicinity (McKechnie et al, 1983; New Brunswick, 1982).

Whereas experience in the literature review suggests that maximum impacts tend to occur during construction and the first few years of a facility's operation, and values tend to revert close to pre-impact levels after some years, no allowance is made for this effect. The rationale for this procedure is as follows:

- There is no clear pattern in the literature to predict how close values return to their previous level after ten years of operation. It is possible that as the facilities become accepted over time, perceptions will change and property values will improve. This effect is considered in the sensitivity analysis undertaken in Chapter 6.

- Some reversal of negative property impacts has been noted with rehabilitation of old landfill sites. Since a physical/chemical treatment and solidification plant and incinerator will be built adjacent to OWMC engineered landfill in the integrated scenario, it is unlikely that the OWMC engineered landfill will be rehabilitated to such an extent as to make it an attractive location for alternative land uses.

- The continuing operation of the incinerator and physical/chemical treatment and solidification plant will ensure that not all negative perceptions regarding the facilities will diminish over time. Although new owners may buy (at reduced prices) property near the site, and may be less concerned about the facilities than the previous residents, the quality of life around the rural siting options may be permanently lost.

ESTIMATED TOTAL VALUE OF THE PROPERTY VALUE IMPACTS AROUND THE SITING OPTIONS

METHODOLOGY

The assumed property value impacts presented in Table C-6 are applied to the estimated market value of properties in the vicinity of the siting options (Table C-3) to produce an estimate of the total dollar amount of negative property value impacts around the siting options. The results of these calculations are shown on Table B-7 for the base case assumptions and in Table B-8 for the maximum impact scenario.

FINDINGS

- In the base case scenario the lowest estimated negative property value impacts occurs around LF-9C in West Lincoln, $435,000 in 1983 dollars, while the highest occurs around the Milton siting option LF-4N/PI-13N (Table C-7). Since they involve less land and consequently affect less property in their vicinity, there is a considerable gap between the impacts estimated for the integrated siting options and those estimated for the partially integrated siting options. The former range from $435,000 (LF-9C) to $679,000 (LF-1E) and the latter range from $1.0 million (LF-1E/PI-27E) to $1.9 million (LF-4N/PI-13N).

- Impacts on commercial and industrial properties are rather insignificant for all siting options. Under the base case scenario, negative impacts on farm values constitute the majority of the total impacts, ranging from a low of 66 percent of all losses in value around LF-1E in Niagara Falls to a high of 91 percent around rural LF-9C in West Lincoln.

- As a percent of the total estimated current market value of property in the impact zone around the siting options, the lowest average relative negative impact occurs around siting option LF-1E/PI-27E in Niagara Falls due to the large amount of industrial property in the vicinity which is not impacted (Table C-9). The remainder of the siting options fall into a relatively narrow range, from a 7.1 percent impact on total property value around siting option LF-3C in West Lincoln, to a high of 7.9 percent impact around the LF-4N/PI-1N siting

TABLE C-7

PROPERTY VALUE IMPACT IN THE VICINITY OF THE SITING OPTIONS
BASE CASE, 1983 DOLLARS (000)

Siting Options	Residential Properties			Farm/Vacant Properties			Commercial/Industrial Properties Negatively Affected by OWMC Facilities*			Total All Properties**
	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	
LF-3C	-16	-17	-15	-165	-128	-105	-1	-2	-2	-451
LF-9C	-18	-17	-6	-146	-169	-78	0	0	0	-435
LF-1E	-96	-62	-66	-223	-140	-91	0	0	-1	-679
LF-1E/PI-27E	-70	-97	-88	-343	-283	-138	0	-13	-18	-1,050
LF-4N/PI-1N	-116	-62	-98	-620	-387	-204	0	0	0	-1,487
LF-4N/PI-13N	-230	-167	-166	-590	-458	-283	0	0	-1	-1,912

* The estimated market value of the businesses negatively affected by OWMC in the vicinity of LF-3C is $89,000, $30,000 near LF-1E, $653,000 near LF-1E/PI-27E and $38,000 near PI-13N.

** Totals may not add due to rounding.

Source: Tables C-3 and C-6.

TABLE C-8

PROPERTY VALUE IMPACT IN THE VICINITY OF THE SITING OPTIONS MAXIMUM IMPACT SCENARIO, 1983 DOLLARS (000)

Siting Options	Residential Properties			Farm/Vacant Properties			Commercial/Industrial Properties Negatively Affected by OWMC Facilities*			Total All Properties**
	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	0-500 Metre Zone	501-1,000 Metre Zone	1,001-1,500 Metre Zone	
LF-3C	-45	-49	-42	-219	-170	-140	-2	-3	-3	-673
LF-9C	-53	-48	-18	-195	-226	-104	0	0	0	-644
LF-1E	-276	-178	-191	-298	-187	-122	0	0	-2	-1,251
LF-1E/PI-27E	-202	-280	-252	-457	-377	-184	0	-17	-24	-1,794
LF-4N/PI-1N	-332	-178	-281	-827	-516	-272	0	0	0	-2,407
LF-4N/PI-13N	-685	-479	-479	-798	-611	-377	0	0	-2	-3,429

* The estimated market values of these businesses is provided in Table C-3.
** Totals may not add due to rounding.

Source: Tables C-3 and C-6.

option on Milton. This restricted range is due to the relatively similar mix of property in the vicinity of these more rural siting options (between 95 and 99 percent of these properties are farmland) and the small differential between the negative property impacts assumed under the base case (Table C-6).

TABLE C-9

PROPERTY VALUE IMPACTS AS A PERCENT OF THE TOTAL MARKET VALUE OF PROPERTY IN THE VICINITY OF THE SITING OPTION

Siting Options	Base Case Scenario	Maximum Impact Scenario
	Percent	
LF-3C	-7.1	-10.6
LF-9C	-7.5	-11.0
LF-1E	-7.6	-13.9
LF-1E/PI-27E	-4.2	-7.1
LF-4N/PI-1N	-7.9	-12.8
LF-4N/PI-13N	-7.5	-13.5

Source: Tables C-3, C-7 and C-8.

- The relative ranking of the siting options, in terms of the total dollar value of the negative impacts, changes only for the three least preferred options under the maximum impact scenario. Whereas siting option LF-4N/PI-1N is the least preferred in the base case, siting option LF-1E is the least preferred under the maximum impact scenario.

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APPENDIX D
DESCRIPTION OF EMPLOYMENT IMPACT ESTIMATES

TABLE OF CONTENTS

Page

Introduction D-1

A Review of the Employment Multiplier D-2

Application of the Model to OWMC Siting Options D-11

Comparison With Other Economic Multiplier Studies D-44

APPENDIX D

DESCRIPTION OF EMPLOYMENT IMPACT ESTIMATES

INTRODUCTION

This appendix provides an estimate of employment impacts of OWMC facilities on the economies of the candidate regional municipalities. The analysis is directed at estimating an employment multiplier for each of the candidate regional municipalities from employment at OWMC facilities. An employment multiplier is defined as the ratio of total employment impacts (direct, indirect and induced) to employment at OWMC facilities (direct and indirect).

An employment multiplier, as opposed to an income multiplier, has been used in this analysis primarily because of data availability and ease of calculation. Data on income flows (which are necessary to estimate income multipliers) are not available for a small geographical area such as these being studied here. While this limitation could be overcome through detailed surveys, and through the use of several indirect sources of income information, this approach is costly and time consuming, and is considered not to improve the comparative evaluation of economic base impacts between siting options. The employment multiplier estimated in this analysis is considered to provide a reasonable estimate of the employment impacts of OWMC facilities on the candidate regional municipalities, and is suitable for the comparative evaluation of siting options.

The employment multipliers estimated in this chapter exclude the impact of possible spin-off industries, which use the products and services of OWMC facilities (forward linkages). Spin-off industries are defined here as those industries which are closely associated with a base idustry, such as OWMC facilities, and which locate in the area specifically because of the products and services provided by the base industry or the products and services purchased by the base industry from these firms. The services and products purchased by OWMC from the local economy (backward linkages) are included in the estimate of the employment multiplier. A discussion in Appendix F of this report deals specifically with the question of spin-off industries associated with OWMC facilities.

This appendix provides details behind the employment multiplier methodology. There are three sections:

- A review of the employment multiplier model used in this analysis;
- The application of the model to OWMC siting options; and
- A comparison of the results of the analysis with similar economic base analyses.

A REVIEW OF THE EMPLOYMENT MULTIPLIER

The methodology used in estimating the employment impacts of OWMC facilities on the region in which they may be located was adapted for this assignment from A Guide to Regional Multiplier Estimation, prepared for the Project Assessment and Evaluation Branch, Department of Regional Economic Expansion in 1982 by Dr. Harvey Schwartz of York University. This methodology was selected following a review of available literature on the subject, including the examination of a number of recent studies which have estimated the economic impacts of industrial projects on the surrounding region.

The estimating technique used here to determine employment multipliers is closely aligned with location quotient techniques which are used for such analyses. This technique estimates an average employment multiplier for the entire economy, rather than individual industrial sector multipliers. There are alternative estimating techniques which provide employment multipliers for individual industrial sectors; input-output analysis is one such technique. The data requirements for these techniques are considerable and are well beyond the needs of the comparative evaluation analysis undertaken here. The location quotient technique is considered to be a reasonable means of comparing employment impacts of OWMC facilities between candidate regional municipalities.

The main components of the model are described in this section. Refinements necessary to make the results of the model meaningful to an analysis of the employment impacts of OWMC facilities are presented in the following section.

BASIC VERSUS NON-BASIC SECTORS

For the purposes of the employment multiplier model, economic activities in the region are divided into two sectors:

- Basic industries - those serving markets outside the region; and

- Non-basic industries - those serving the regional market.

Employment multiplier models are used to measure the changes in regional income and employment which occur as a result of changes in employment in the region's basic industries.

As described by Schwartz:

> "Spending on the commodities produced by the basic sector is exogenously determined - that is, it is set by events outside the region. An increase in basic spending will increase the income of the basic sector and lead to additional spending on non-basic commodities by regional residents attached to the basic sector. This in turn will cause the income of the non-basic sector to grow. Since regional residents attached to the non-basic sector now find that their incomes have risen, they too will alter their spending on non-basic commodities. The process can be viewed as continuing, with additional rounds of non-basic spending generating more regional income and inducing more non-basic spending. However, the process will eventually come to a halt because each round of non-basic spending will be smaller than the additional income that brought it about. At this point, the regional economy will have reached a new equilibrium where the level of income in the basic sector, in the non-basic sector and in the regional economy as a whole is greater than before, and where the change in regional income is some multiple of the initial change in basic sector income."*

THREE ROUNDS OF ECONOMIC ACTIVITY

By examining the relationship between the region's basic and non-basic sectors, a model can be derived to predict the effects which new export-based economic activities such as OWMC facilities (representing an increase in basic employment) will have on employment in the non-basic sector and, hence, on total employment in the region. The model is based on three rounds of economic activity:

- Direct round - employment involved in the actual operation of the new facilities;

- Indirect round - employment created in activities in the region which are linked to the facilities as suppliers of inputs; and

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* Harvey Schwartz, A Guide to Regional Multiplier Estimation, 1982, page 8.

- Induced round - employment created in the non-basic sector of the region as a result of the expenditures of the incomes generated in the direct and indirect rounds.

The employment generated in the direct and indirect rounds is considered to be basic employment since these rounds are both related to the actual operation of the facilities, which are primarily exporting products to markets outside the region.* The employment generated in the region as a result of the induced round is considered to be non-basic employment.

TWO PHASES OF EMPLOYMENT IMPACTS

In the assessment of the employment impacts of a new industrial activity in a region, there are generally two phases of impacts:

- Construction phase - the employment generated during the period when the plant is under construction; and

- Operating phase - the employment generated by the actual operation of the plant.

It is the latter phase, the operation of OWMC facilities in their tenth year, that is the focus of the analysis here.**

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* The model generally applies to basic industries which export products. The procedure is equally applicable to activities such as OWMC facilities which process materials received from outside the region.

** The employment multiplier analysis in this study does not consider impacts during the construction phase since the impacts are relatively short-lived (eighteen months) and, with the high mobility of construction workers and the proximity of the large centres of Toronto, Mississauga and Hamilton, few construction workers are likely to relocate to the regions in which the facilities would be constructed.

The assumed facilities have the capacity to process 300,000 tonnes of special waste per year. As part of the analysis, a sensitivity test has also been prepared for an alternative scenario - that of the employment impacts of facilities with a capacity of 150,000 tonnes per year.

THE EMPLOYMENT MULTIPLIER

The employment generated during the induced round as a result of the location of some new export-oriented facilities in the region is non-basic. It provides goods and services to the households resident in the region who have a source of income either directly from the facilities or from some other economic activity which provides inputs to the operation of the facilities.

By examining the total structure of the regional economy and designating the various industries as basic or non-basic, a relationship between the two types of industries can be derived which can be used to estimate the amount of employment that will be generated by an increase in basic employment. This relationship can be expressed by the following equation:

$$K = 1 + N/B^*$$

where:

- K is the total employment multiplier;

---

* This is the total employment multiplier, it includes both the new basic jobs and the non-basic jobs generated as a result of the new basic jobs. Another multiplier, the non-basic/basic employment multiplier (N/B) can be used to measure only the non-basic jobs created.

- N is non-basic employment; and

- B is basic employment.

For example, if the region's economic structure is such that there are 120 non-basic jobs for every 100 basic jobs, the multiplier would be 2.2.

Assuming a new export-oriented facility requiring 250 permanent workers locates in a region and also creates 150 (indirect) jobs in local industries to provide inputs into the operation of the facility, the direct and indirect employment created totals 400 jobs. These are all considered to be basic jobs since they are involved in producing goods for export outside the region. Assuming that all of these new workers migrate to the region and that the regional employment multiplier is 2.2, it is estimated that, over time (possibly up to five years), a total of 880 jobs would be created; this includes an additional 480 non-basic jobs generated in the process of providing the local goods and services demanded by the direct and indirect workers and their households.

The analysis becomes complicated when it is recognized that not all new workers will necessarily move to the region and that many may have lived in the region prior to the opening of the new facility.

- The new workers who do not live in the region, but instead commute, will not have the same impact on non-basic employment as those who do live in the region. Depending on how far away they live from the region, they may have little or no impact on non-basic employment in the region - instead, they would generate non-basic employment in another region.

- The new workers who already live in the region will already be consuming goods and services produced in the region and so cannot be expected to generate the same additional volume of non-basic employment as workers migrating into the region. They will likely increase their consumption of some local goods and services, with consequent impacts on non-basic employment, but not to the extent that the multiplier might suggest.

These factors need to be taken into account when estimating the amount of non-basic employment likely to be generated by an increase in basic employment in a region. They require significant modifications to the multiplier formula presented on page D-6 - these modifications and other refinements to the analysis in the case of OWMC facilities are presented later in the appendix.

ESTIMATING BASIC AND NON-BASIC EMPLOYMENT

Estimating the amount of basic and non-basic employment in a region involves an examination of the breakdown of employment by industry compared to employment in a larger benchmark area - in the case of the model used in this analysis, total provincial employment by industry. The examination entails the construction of a location quotient (defined below) for each industry in the region. The location quotient, plus other relevant data and available information on industry in the region, is used as the basis for disaggregating regional employment into estimates of basic and non-basic employment. It should be recognized at the outset that this process involves a substantial amount of judgement since there is no reliable method, short of a comprehensive survey of all industries, to estimate which workers in each of the industries are involved in producing goods and services for use outside the region and which serve the local market.

Location quotients

In this analysis, location quotients are used as a measure of regional concentration in a given industry compared to the concentration of that industry at the provincial level. The formula for location quotient which has been used for this analysis is:

$$LQ_i = \frac{E_{ir}}{E_{tr}} / \frac{E_{ip}}{E_{tp}}$$

where:

- LQ_i is the region's location quotient for industry i;
- E_{ir} is total regional employment in industry i;
- E_{tr} is total regional employment;
- E_{ip} is total provincial employment in industry i; and
- E_{tp} is total provincial employment.

If the region's location quotient for the industry is greater than 1, the region has a greater concentration of employment in that particular industry than does the province as a whole. It implies a regional specialization in this industry and at least some exports of the commodities produced by the industry. Basic employment in that industry would be represented by:

$$E_{Bir} = E_{ir} - \frac{E_{ip}}{E_{tp}} \cdot E_{tr}$$

where:

- E_{Bir} is basic regional employment in industry i;
- E_{ir} is total regional employment in industry i;
- E_{ip} is total provincial employment in industry i;
- E_{tp} is total provincial employment; and
- E_{tr} is total regional employment.

The remainder of the employment in the industry (i.e., that proportion of the region's employment in the industry which is equal to the provincial average) is considered to be non-basic. This employment is considered to be supplying local demands.

The industries for which the location quotient is less than 1 are considered to be non-basic - regional production is insufficient to supply regional needs and at least some of the commodity is imported.

Other information

By itself, a location quotient is a crude method of determining basic and non-basic employment in a region. For the analysis here, the location quotients calculated for each industry were supplemented by other available information to provide a more reliable disaggregation of regional employment into basic and non-basic sectors.

The specific method of estimating basic and non-basic employment in each industry in the two regions under consideration is reviewed in the section dealing with the estimates themselves. In general, the location quotients were not used for those industries where an examination of the profile of large local employers or the general characteristics of the industry in question were considered to provide a better indication of basic and non-basic employment than the location quotient.

REFINEMENTS TO THE MODEL

In the next section, the employment implications of OWMC facilities are estimated for the six siting options. The employment multiplier applied in that section is based on the one described here. However, a number of modifications and refinements have been made to the model because of the particular requirements of the analysis. Rather than try to describe all of these modifications and refinements in this overview section, they are described in detail as they arise in the actual analysis. The purpose of this initial section is to acquaint the reader with the main concepts involved in the model.

APPLICATION OF THE MODEL TO OWMC SITING OPTIONS

Based on the methodology for the employment multiplier model presented in the first section of this appendix, this section presents the estimates of basic and non-basic employment in each of the two regions where OWMC siting options are being evaluated as well as the estimated regional employment impacts of locating OWMC facilities at each of the siting options.

EMPLOYMENT IN EACH REGION BY INDUSTRY

Table D-1 presents data from the 1981 Census of Canada on the employed labour force by industry in the Province of Ontario as well as the Halton and Niagara Regions. The industry specific data relate to employment by place of work (i.e., they do not include residents of each region who commute to work in other regions).

LOCATION QUOTIENTS IN EACH REGION BY INDUSTRY

Table D-2 presents the location quotients which were calculated for each industry in each region using the Province of Ontario as the benchmark.* Location quotients in excess of 1 indicate that the region has a greater proportion of its workforce in the industry than does the province as a whole which implies that the region specializes in this industry and is exporting at least some of these goods and services to other regions.

Many industries, such as manufacturing, have location quotients calculated in Table D-2 for both the total industry and the component sectors such as food and beverages (itself disaggregated into subsectors), primary metal industries, etc. It is the location quotients of the disaggregated sectors and subsectors which have been used, along with other available information, to establish basic and non-basic employment in each industry.

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* In calculating the location quotients, net commuters to workplaces outside the regions (29,275 in Halton and 9,385 in Niagara) are included as part of total basic employment for the purpose of measuring regional specialization in the various industries - they are included in the total regional employment figure used in the denominator of the location quotient formula presented on page D-9. These commuters are particularly important when assessing the regional role of service types of industries since they demand non-basic goods and services in the same way that workers who both live and work in the region do.

TABLE D-1

EMPLOYED LABOUR FORCE AGED 15 AND OVER BY INDUSTRY AND PLACE OF WORK FOR THE REGIONS OF HALTON AND NIAGARA AND THE PROVINCE OF ONTARIO, 1981

	Ontario	Halton	Niagara
AGRICULTURE	136875	2705	6385
FORESTRY	13145	10	105
FISHING	2270	10	40
MINING	40605	380	425
MANUFACTURING	1004640	29240	47250
Food and Beverages	98270	2295	3270
Meat Products	17275	715	280
Fish Products	585	0	20
Fruit and Vegetables	8390	310	630
Dairy Products	8690	75	180
Flour and Cereals	3200	35	515
Feed Industry	4115	215	80
Bakery Products	16920	375	510
Miscellaneous	21115	540	580
Beverages	13120	25	475
Tobacco	2930	20	15
Rubber and Plastics	39625	1350	735
Leather Industries	16280	700	720
Textile Industries	33825	380	1020
Knitting Mills	7320	85	175
Clothing Industries	29125	240	225
Wood Industries	27800	645	520
Furniture Industries	30790	300	435
Paper and Products	50990	1215	3300
Printing and Publishing	63800	1130	1170
Primary Metal Industries	81165	1340	7310
Metal Fabricating	104160	4295	5125
Machinery Industries	69090	1935	3010
Transportation Equip.	124275	6205	13790
Electrical Products	86040	2780	1185
Non-Metallic Minerals	29560	1095	2510
Petroleum Products	10615	710	155
Chemical Products	53335	1320	1680
Miscellaneous Manuf.	47655	1150	1025
CONSTRUCTION	231940	5960	8860
General Contractors	82035	2195	2810
Special Trades	149900	3755	6050
TRANSPORTATION & UTILITIES	308660	4245	9485
Transportation	162875	2425	5920
Storage	6485	195	70
Communication	86350	975	1800
Utilities	52940	640	1675
TRADE	712265	20845	25170
Wholesale Trade	208415	5875	5410
Retail Trade	503845	14965	19760
FINANCE AND INSURANCE	254085	5110	6420
Finance Industries	125965	2270	3705
Insurance Carriers	47545	665	575
Ins. Agencies/Real Estate	80580	2180	2150
SERVICES	1216510	28960	46975
Education and Related	270815	7015	9540
Health and Welfare	291985	5695	10650
Religious Organizations	19595	480	775
Amusement and Recreation	54245	1575	2955
Business Management	197850	3980	5120
Personal Services	68445	1865	2540
Accommodation and Food	224435	5720	12515
Miscellaneous Services	89145	2590	2905
PUBLIC ADMIN. AND DEFENCE	297625	4515	6545
Federal Administration	145810	1195	1800
Provincial Administration	67930	1010	1425
Local Administration	83880	2310	3315
TOTAL EMPLOYMENT BY PLACE OF WORK	4218620	101780	157460
NET NUMBER OF COMMUTERS	0	29275	9385
TOTAL EMPLOYMENT BY PLACE OF RESIDENCE	4218620	131055	166845

Note: Totals may not add due to rounding.

Source: 1981 Census of Canada.

TABLE D-2

LOCATION QUOTIENTS BY INDUSTRY
REGIONS OF HALTON AND NIAGARA, 1981

	Halton	Niagara
AGRICULTURE	0.64	1.18
FORESTRY	0.02	0.20
FISHING	0.14	0.45
MINING	0.30	0.26
MANUFACTURING	0.94	1.19
Food and Beverages	0.77	0.86
Meat Products	1.33	0.11
Fish Products	0.00	0.86
Fruit and Vegetables	1.19	1.90
Dairy Products	0.28	0.52
Flour and Cereals	0.35	4.07
Feed Industry	1.68	0.49
Bakery Products	0.71	0.76
Miscellaneous	0.82	0.67
Beverages	0.36	0.92
Tobacco	0.22	0.13
Rubber and Plastics	1.10	0.47
Leather Industries	1.38	1.12
Textile Industries	0.38	0.76
Knitting Mills	0.37	0.60
Clothing Industries	0.27	0.20
Wood Industries	0.75	0.47
Furniture Industries	0.31	0.36
Paper and Products	0.77	1.64
Printing and Publishing	0.57	0.46
Primary Metal Industries	0.53	2.28
Metal Fabricating	1.33	1.24
Machinery Industries	0.90	1.10
Transportation Equip.	1.61	2.81
Electrical Products	1.04	0.35
Non-Metallic Minerals	1.19	2.15
Petroleum Products	2.15	0.37
Chemical Products	0.80	0.80
Miscellaneous Manuf.	0.78	0.54
CONSTRUCTION	0.83	0.94
General Contractors	0.86	0.80
Special Trades	0.81	1.02
TRANSPORTATION & UTILITIES	0.44	0.78
Transportation	0.48	0.92
Storage	0.97	0.27
Communication	0.36	0.53
Utilities	0.39	0.80
TRADE	0.93	0.89
Wholesale Trade	0.88	0.86
Retail Trade	0.96	0.99
FINANCE AND INSURANCE	0.65	0.64
Finance Industries	0.58	0.74
Insurance Carriers	0.45	0.31
Ins. Agencies/Real Estate	0.87	0.67
SERVICES	0.77	0.98
Education and Related	0.83	0.89
Health and Welfare	0.63	0.92
Religious Organizations	0.79	1.00
Amusement and Recreation	0.93	1.38
Business Management	0.65	0.65
Personal Services	0.88	0.94
Accommodation and Food	0.82	1.41
Miscellaneous Services	0.94	0.82
PUBLIC ADMIN. AND DEFENCE	0.49	0.56
Federal Administration	0.26	0.31
Provincial Administration	0.48	0.53
Local Administration	0.89	1.00

ESTABLISHMENT OF BASIC AND NON-BASIC EMPLOYMENT

Estimates of basic and non-basic employment by industry (for employment by place of work) are presented in Tables D-3 and D-4 for the Regions of Halton and Niagara, respectively. These estimates were based partly on the location quotients presented in Table D-2 but also took into consideration the profile of all large (50 employees and over) firms in the two regions and an assessment of the likely markets for the products of those firms.* A review of the analysis of basic and non-basic employment in the region by industry is presented on the following pages.

The method of allocation of basic versus non-basic employment for each industry is indicated in Tables D-3 and D-4: "A" indicates the allocation was assigned based on local information and the analyst's judgement; "LQ" indicates the allocation was based on the location quotient; and "ALQ" indicates a combination of location quotient allocation and judgement based on local information.

Primary industries

Primary industries (agriculture, forestry, fishing and mining) are generally presumed to be basic industries for the purposes of

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* This information was obtained from the Halton Industrial Directory, 1984, prepared by the Halton Region Business Development Department and the Niagara Industrial Directory, 1984, prepared by the Niagara Region Development Corporation which register firms by the same Statistics Canada standard industrial classifications used in the Census of Canada. While individual firms' employment information by industry was obtained for all types of industries, only those considered to be exporting goods or services to other regions were considered to be basic employment.

TABLE D-3

BASIC AND NON-BASIC EMPLOYMENT
HALTON REGION, 1981

	EMPLOYMENT			METHOD OF ALLOCATION*
	TOTAL	BASIC	NON-BASIC	
AGRICULTURE	2705	2705	0	A
FORESTRY	10	10	0	A
FISHING	10	10	0	A
MINING	380	380	0	A
MANUFACTURING	29240	24050	5190	
Food and Beverages	2295	850	1445	
Meat Products	715	715	0	A
Fish Products	0	0	0	LQ
Fruit and Vegetables	310	50	260	LQ
Dairy Products	75	0	75	LQ
Flour and Cereals	35	0	35	LQ
Feed Industry	215	85	130	LQ
Bakery Products	375	0	375	LQ
Miscellaneous	540	0	540	LQ
Beverages	25	0	25	LQ
Tobacco	20	20	0	A
Rubber and Plastics	1350	1350	0	A
Leather Industries	700	525	175	ALQ
Textile Industries	380	0	380	LQ
Knitting Mills	85	0	85	LQ
Clothing Industries	240	60	180	ALQ
Wood Industries	645	200	445	ALQ
Furniture Industries	300	0	300	LQ
Paper and Products	1215	1215	0	A
Printing and Publishing	1130	100	1030	ALQ
Primary Metal Industries	1340	1340	0	A
Metal Fabricating	4295	4295	0	A
Machinery Industries	1935	1935	0	A
Transportation Equip.	6205	6205	0	A
Electrical Products	2780	2780	0	A
Non-Metallic Minerals	1095	600	495	ALQ
Petroleum Products	710	710	0	A
Chemical Products	1320	1320	0	A
Miscellaneous Manuf.	1150	500	650	ALQ
CONSTRUCTION	5950	0	5950	
General Contractors	2195	0	2195	LQ
Special Trades	3755	0	3755	LQ
TRANSPORTATION & UTILITIES	4245	150	4095	
Transportation	2425	150	2275	ALQ
Storage	195	0	195	LQ
Communication	975	0	975	LQ
Utilities	640	0	640	LQ
TRADE	20845	1100	19545	
Wholesale Trade	5675	1100	4575	ALQ
Retail Trade	14965	0	14965	LQ
FINANCE AND INSURANCE	5110	235	4875	
Finance Industries	2270	0	2270	LQ
Insurance Carriers	665	0	665	LQ
Ins. Agencies/Real Estate	2180	235	1945	LQ
SERVICES	28960	200	28760	
Education and Related	7015	0	7015	LQ
Health and Welfare	5695	0	5695	LQ
Religious Organizations	480	0	480	A
Amusement and Recreation	1575	0	1575	LQ
Business Management	3980	200	3780	ALQ
Personal Services	1865	0	1865	LQ
Accommodation and Food	5720	0	5720	LQ
Miscellaneous Services	2590	0	2590	LQ
PUBLIC ADMIN. AND DEFENCE	4515	0	4515	
Federal Administration	1195	0	1195	LQ
Provincial Administration	1010	0	1010	LQ
Local Administration	2295	0	2295	A
TOTAL	101780	28840	72940	

* See text for a description of the Method of Allocation codes.

Source: Derived from 1981 Census of Canada data.

TABLE D-4

BASIC AND NON-BASIC EMPLOYMENT
NIAGARA REGION, 1981

	EMPLOYMENT			METHOD OF ALLOCATION*
	TOTAL	BASIC	NON-BASIC	
AGRICULTURE	6385	6385	0	A
FORESTRY	105	105	0	A
FISHING	40	40	0	A
MINING	425	425	0	A
MANUFACTURING	47250	40770	6480	
Food and Beverages	3270	1645	1625	
Meat Products	280	280	0	A
Fish Products	20	0	20	LQ
Fruit and Vegetables	630	400	230	ALQ
Dairy Products	180	0	180	LQ
Flour and Cereals	515	480	35	ALQ
Feed Industry	80	0	80	LQ
Bakery Products	510	0	510	LQ
Miscellaneous	560	0	560	LQ
Beverages	475	475	0	A
Tobacco	15	15	0	A
Rubber and Plastics	735	735	0	A
Leather Industries	720	210	510	ALQ
Textile Industries	1020	700	320	ALQ
Knitting Mills	175	0	175	LQ
Clothing Industries	225	100	125	ALQ
Wood Industries	520	100	420	ALQ
Furniture Industries	435	0	435	LQ
Paper and Products	3300	3300	0	A
Printing and Publishing	1170	260	910	ALQ
Primary Metal Industries	7310	7310	0	A
Metal Fabricating	5125	5125	0	A
Machinery Industries	3010	3010	0	A
Transportation Equip.	13790	13790	0	A
Electrical Products	1185	1185	0	A
Non-Metallic Minerals	2510	1050	1460	ALQ
Petroleum Products	155	155	0	A
Chemical Products	1680	1680	0	A
Miscellaneous Manuf	1025	500	525	ALQ
CONSTRUCTION	8660	120	8540	
General Contractors	2610	0	2610	LQ
Special Trades	6050	120	5930	LQ
TRANSPORTATION & UTILITIES	9465	0	9465	
Transportation	5920	0	5920	LQ
Storage	70	0	70	LQ
Communication	1800	0	1800	LQ
Utilities	1675	0	1675	LQ
TRADE	25170	0	25170	
Wholesale Trade	5410	0	5410	LQ
Retail Trade	19760	0	19760	LQ
FINANCE AND INSURANCE	6420	0	6420	
Finance Industries	3705	0	3705	LQ
Insurance Carriers	575	0	575	LQ
Ins. Agencies/Real Estate	2150	0	2150	LQ
SERVICES	46975	5150	41825	
Education and Related	9540	0	9540	LQ
Health and Welfare	10850	0	10850	LQ
Religious Organizations	775	0	775	A
Amusement and Recreation	2955	815	2140	LQ
Business Management	5120	700	4420	ALQ
Personal Services	2540	0	2540	LQ
Accommodation and Food	12515	3640	8875	LQ
Miscellaneous Services	2905	0	2905	LQ
PUBLIC ADMIN. AND DEFENCE	6545	0	6545	
Federal Administration	1800	0	1800	LQ
Provincial Administration	1425	0	1425	LQ
Local Administration	3315	0	3315	A
TOTAL	157460	52995	104465	

* See text for a description of the Method of Allocation codes.

Source: Derived from 1981 Census of Canada data.

economic base analyses, even if they have a location quotient of less than 1. In the case of the primary industries of the two regions under consideration, it would appear that they are heavily dependent on the metropolitan markets of Toronto and Hamilton and, in some cases such as fruit growing in the Niagara Region, the provincial and national markets. All employment in these industries has been designated as basic for the purposes of this analysis.

Manufacturing

Manufacturing is too large and diverse an industry to be dealt with as a whole so it has been disaggregated into its component sectors. Many manufacturing firms have specialized into products which cater to provincial or national markets and location quotients have little meaning in these cases. Therefore, considerable reliance has been placed on the review of large employers in the two regions (50 or more employees). The allocation of basic and non-basic employment in sectors with large export-oriented firms is based on a combination of this information plus the location quotients.

Food and beverages. This sector has been disaggregated into component subsectors. Location quotients were used in allocating basic and non-basic employment except where noted below:

- Meat products workers were allocated on the basis of employment in large firms identified in the two regions such as F.W. Fearman Co. in Halton and several companies, including Port Colborne Poultry Ltd., in Niagara.
- Fruit and vegetable manufacturing firms in Niagara include Gerber Canada Inc. and Cadbury Schweppes Powell Inc. and

workers in these firms have been designated as basic. In Halton, no large firms were identified and the location quotient was used to allocate basic and non-basic employment.

- Flour and cereals manufacturers in Niagara include Nabisco Brands Ltd. and Robin Hood Multifoods Inc. Workers at these large firms were considered to be basic. In Halton, no large manufacturers were identified and the location quotient was used.

- Beverage firms in Niagara include four large wineries. All employment in the beverage industry in Niagara was designated as basic.

Tobacco. This small industry was considered to be basic.

Rubber and plastics. Several large firms are engaged in this industry in Halton led by Bonar Packaging Ltd. with 450 employees, and several other firms which employ around 200 workers each. In Niagara, General Tire Canada Ltd. employs 550 workers. All employment in this sector was considered to be basic.

Leather industries. Large firms which appear to cater to markets beyond the immediate region account for 540 workers in Halton and 220 in Niagara. These were considered to be basic workers despite the location quotients which would have yielded lower estimates of basic employment.

Textile industries. Wabasso Inc., the largest textile employer in either region, had over 400 workers in Niagara in 1981 (the firm has recently ceased operations) but most of the remainder of the employment in textile industries appears to be non-basic judging by the low location quotients in both regions.

Knitting mills. There are no large employers in either region in this sector. The low location quotients indicate all employment is likely non-basic.

Clothing industries. Location quotients of 0.27 and 0.20 in Halton and Niagara, respectively, indicate little specialization in clothing industries. However, some large employers were identified and an allocation was made of some employment to the basic sector.

Wood industries. In both regions, low location quotients indicate little specialization in wood industries. However, an examination of large employers indicates some export-oriented activity and an adjustment was made for employment at these firms.

Furniture industries. Low location quotients and no large manufacturers indicate that all employment in furniture industries in both regions is likely non-basic.

Paper and allied products. Niagara has a location quotient of 1.64 in the paper and allied products sector indicating likely export-oriented production; this was confirmed by the large manufacturers in the region headed by the Ontario Paper Co. and Fraser Inc. Halton had a low location quotient but still significant production by large employers. All employment in this sector in both regions was considered to be basic.

Printing and publishing. Low location quotients indicate little regional specialization in the printing and publishing sector but some large firms which appear export-oriented are located in each region. Discounting employment in the local newspapers, workers in these large firms have been allocated to the basic sector.

Primary metal industries. The location quotient of 2.28 in Niagara indicates a strong export-oriented primary metal industry centered around Atlas Steels and Inco Ltd. (employing more than 2,000 workers between them). Halton has a much lower degree of specialization in this sector, as reflected in its location quotient of 0.53, but still has over 40 percent of its workers employed by export-oriented firms with 50 or more employees. All employment in this sector was considered to be basic.

Metal fabricating. Location quotients larger than 1 indicate a significant export-oriented metal fabricating industry in both Halton and Niagara. This is confirmed by examination of the employment in metal fabricating firms with 50 or more employees (which account for about two-thirds of the employment in this sector in both regions). Large firms in this sector include Foster Wheeler Ltd. and Horton CBI Ltd. in Niagara (accounting for almost 1,000 employees between them) and Frankel Steel Ltd. and Butler Manufacturing Co. (over 500 employees) in Halton. All employment in this sector has been assumed to be basic.

Machinery industries. This sector is considered to be predominantly export-oriented and all employment was assigned to the basic sector. One company (John Deere Ltd.) in Niagara accounted for almost half the Region's employment in the machinery industry. Firms of 50 or more employees comprised over three-quarters of Niagara's employment in this industry and slightly less than one-third of Halton's.

Transportation equipment. Large employers dominate this sector in both regions, particularly the Ford Motor Co. (5,500 employees) in Halton and General Motors Ltd. (8,500 employees) in Niagara. All employment was assigned to the basic sector.

Electrical products. All employment in the electrical products sector was considered to be basic employment. In Niagara, despite a location quotient of well below 1, large employers like Fleet Aerospace Corp. and Union Carbide Ltd. dominate the industry. In Halton, Canadian General Electric Co. and Varian Canada Inc. are major employers who export their products outside the region.

Non-metallic minerals. Location quotients in excess of 1 for non-metallic minerals in each region indicate an export-oriented sector and this was confirmed by the presence of large firms such as Smith and Stone Inc. in Halton (330 employees) and Norton Company in Niagara (415 employees). Part of the employment in this industry was allocated to the basic sector on the basis of these large firms serving markets outside the region.

Petroleum products. The Petro-Canada Inc. refinery and ancillary facilities in Halton are responsible for the location quotient of 2.15 for the region. All petroleum products employment in both regions was allocated to the basic sector.

Chemical products. These are considered to be basic industries. Virtually all the Niagara chemical industry employment is accounted for by large firms - predominantly Cyanamid Canada Inc. In Halton, large firms accounted for three-quarters of chemical industry employment.

Miscellaneous manufacturers. Despite low location quotients, some of the employment in this sector was considered to be basic as a result of an analysis of large firms in the two regions.

Construction

Construction employment in both regions was allocated on the basis of the location quotients which, except for special trades in Niagara, are less than 1. Thus, most construction employment is non-basic.

Transportation and utilities

Transportation. Low location quotients indicate little regional specialization but there are some large employers such as Travelways and Maris Transport Ltd. in Halton which appear export-oriented. Except for workers in these firms, all employment (based on the location quotients) is assumed to be non-basic.

Storage, communication and utilities. These sectors have low location quotients and no employers in either region with more than 50 workers. All employment is assumed to be non-basic based on the location quotients of less than 1 in both regions.

Trade

Trade is disaggregated into wholesale trade and retail trade.

Wholesale trade. A review of major employers indicated no large export-oriented wholesale firms in Niagara and this is reflected in the 0.66 location quotient. There are some large wholesale firms in Halton which likely export to points beyond the regional boundary despite the fact that the location quotient is only 0.88. An estimate of basic wholesale trade employment was made based on this information for Halton.

Retail trade. The allocation between basic and non-basic employment in retail trade utilized the location quotients for both regions.

Finance and insurance

No large export-oriented firms were identified in this industry, therefore, the allocation between basic and non-basic employment utilized the location quotients which were less than 1 for all sectors in each region.

Services

With only one exception, the location quotients were utilized to allocate basic and non-basic employment in the service sector. The exception was the business management sector which has some export-oriented firms in each region; examples include Acres Consulting Services Ltd. in Niagara.

Public administration and defence

Federal and provincial administration have very low location quotients in both regions and all employment has been allocated to the non-basic sector. All local administration employment was considered to be non-basic since the services of this sector are consumed in the region.

Commuters

Tables D-3 and D-4 cover the employed labour force working in Halton and Niagara. This understates basic employment in the regions to the extent that the employed commuter work force constitutes another significant export which provides income to the regions and hence generates non-basic employment. Estimates of the net number of commuters were calculated from 1981 Census of Canada data; they are the difference between the employed labour force in each region by place of residence and the employed labour force by place of work:

- In Halton, there is a very large net commuting workforce into Toronto, Mississauga and Hamilton estimated to total 29,275 persons in 1981.
- In Niagara, the net commuting workforce is much smaller, totalling only 9,385 persons in 1981.

Total basic and non-basic employment

Adding the net number of commuters onto the total basic and non-basic employed labour force working in each region from Tables D-3 and D-4 yields estimated total basic and non-basic employment resident in the regions - shown in Table D-5.

TABLE D-5

RESIDENT BASIC AND NON-BASIC EMPLOYMENT
REGIONS OF HALTON AND NIAGARA, 1981

	Basic	Non-Basic	Total
	Number of Workers		
Halton			
Employment Working in Region	28,840	72,940	101,780
Net Commuters	29,275	-	29,275
Total	58,115	72,940	131,055
Niagara			
Employment Working in Region	52,995	104,465	157,460
Net Commuters	9,385	-	9,385
Total	62,380	104,465	166,845

THE EMPLOYMENT MULTIPLIER

From Table D-5, it is possible to derive the employment multiplier for each region. Based on the formula K = 1 + N/B (see page D-6), the multipliers are:

- Halton: 2.26; and
- Niagara: 2.67.

Halton's multiplier is substantially lower than Niagara's by virtue of the fact that many of the non-basic activities associated with the expenditure of income by the Region's resident work force are located in the adjacent large centres of Hamilton, Mississauga and Toronto. Therefore, some of the service and trade sector (non-basic) employment generated by Halton's residents is exported to these regions whereas, in Niagara, a greater proportion of the non-basic employment occurs within the region.

Applicability of the multiplier

These multipliers are considered to be appropriate for the situation where all new jobs are filled by workers migrating into a region. Implicitly, the model assumes that these new workers will consume the same package of non-basic goods and services produced in the region that existing basic workers resident in the region consume.

In the case of the basic employment created by OWMC facilities, a significant proportion of the jobs are expected to be filled by workers already resident in the region rather than migrants. To the extent that local rather than migrant workers account for the additional employment, the effect on the non-basic sector will be diminished since the consumption of many non-basic goods and services by current residents (e.g., food, education and utilities) will not likely change appreciably even with the higher incomes generated by the new employment. Estimation of the appropriate multiplier in the case of non-migrating employees requires the disaggregation of non-basic employment into that which is primarily population-related and that which is primarily income-related. Migrant workers will affect both population-related and income-related non-basic industries, but non-migrant workers will affect only income-related industries.*

Population-related and income-related non-basic employment

Tables D-6 and D-7 present the disaggregation of non-basic employment for Halton and Niagara, respectively, into estimated income-related employment and population-related employment. This disaggregation has been based on an analysis of each non-basic industry and an assessment of whether the industry is:

- Primarily population-related (P);
- Primarily income-related (Y); or
- Related to both influences (B).

The industry-by-industry assessment has been based largely on the analysis in Schwartz, A Guide to Regional Multiplier Estimation (pages 95-108), however, some adjustments have been made to Schwartz's conclusions as they apply to Halton and Niagara.

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* The expected migrant/non-migrant proportions of basic and non-basic employment resulting from OWMC facilities are discussed on pages D-36 to D-38.

TABLE D-6

POPULATION RELATED AND INCOME RELATED NON-BASIC EMPLOYMENT
HALTON REGION, 1981

	TOTAL NON-BASIC EMPLOYMENT	POPULATION (P) OR INCOME (Y) RELATED OR BOTH (B)	ESTIMATED EMPLOYMENT	
			POPULATION RELATED	INCOME RELATED
MANUFACTURING	5190		3320	1870
Food and Beverages	1445	P	1445	0
Leather Industries	175	B	85	90
Textile Industries	380	B	190	190
Knitting Mills	85	B	45	40
Clothing Industries	180	B	90	90
Wood Industries	445	B	225	220
Furniture Industries	300	B	150	150
Printing and Publishing	1030	B	515	515
Non-Metallic Minerals	495	B	245	250
Miscellaneous Manuf	650	B	325	325
CONSTRUCTION	5960		2980	2980
General Contractors	2195	B	1100	1095
Special Trades	3755	B	1875	1880
TRANSPORTATION & UTILITIES	4095		2365	1730
Transportation	2275	B	1135	1140
Storage	195	B	100	95
Communication	975	B	485	490
Utilities	640	P	640	0
TRADE	19545		4885	14660
Wholesale Trade	4575	B	1145	3430
Retail Trade	14965	B	3740	11225
FINANCE AND INSURANCE	4875		1215	3660
Finance Industries	2270	B	565	1705
Insurance Carriers	665	B	165	500
Ins. Agencies/Real Estate	1945	B	485	1460
SERVICES	28760		14480	14280
Education and Related	7015	P	7015	0
Health and Welfare	5695	B	2850	2845
Religious Organizations	480	P	480	0
Amusement and Recreation	1575	Y	0	1575
Business Management	3780	B	1890	1890
Personal Services	1865	B	930	935
Accommodation and Food	5720	Y	0	5720
Miscellaneous Services	2590	B	1295	1295
PUBLIC ADMIN. AND DEFENCE	4515		4515	0
Federal Administration	1195	P	1195	0
Provincial Administration	1010	P	1010	0
Local Administration	2295	P	2295	0
TOTAL	72940		33760	39180

TABLE D-7

POPULATION RELATED AND INCOME RELATED NON-BASIC EMPLOYMENT
NIAGARA REGION, 1981

	TOTAL NON-BASIC EMPLOYMENT	POPULATION (P) OR INCOME (Y) RELATED OR BOTH (B)	ESTIMATED EMPLOYMENT	
			POPULATION RELATED	INCOME RELATED
MANUFACTURING	6480		4050	2430
Food and Beverages	1625	P	1625	0
Leather Industries	510	B	255	255
Textile Industries	320	B	160	160
Knitting Mills	175	B	90	85
Clothing Industries	125	B	60	65
Wood Industries	420	B	210	210
Furniture Industries	435	B	220	215
Printing and Publishing	910	B	455	455
Non-Metallic Minerals	1460	B	730	730
Miscellaneous Manuf.	525	B	260	265
CONSTRUCTION	8540		4270	4270
General Contractors	2610	B	1305	1305
Special Trades	5930	B	2965	2965
TRANSPORTATION & UTILITIES	9485		5580	3905
Transportation	5920	B	2960	2960
Storage	70	B	35	35
Communication	1800	B	900	900
Utilities	1675	P	1675	0
TRADE	25170		6295	18875
Wholesale Trade	5410	B	1355	4055
Retail Trade	19760	B	4940	14820
FINANCE AND INSURANCE	6420		1605	4815
Finance Industries	3705	B	925	2780
Insurance Carriers	575	B	145	430
Ins. Agencies/Real Estate	2150	B	535	1615
SERVICES	41825		20565	21260
Education and Related	9540	P	9540	0
Health and Welfare	10650	B	5325	5325
Religious Organizations	775	P	775	0
Amusement and Recreation	2140	Y	0	2140
Business Management	4420	B	2210	2210
Personal Services	2540	B	1270	1270
Accommodation and Food	8875	Y	0	8875
Miscellaneous Services	2905	B	1455	1450
PUBLIC ADMIN. AND DEFENCE	6545		6545	0
Federal Administration	1800	P	1800	0
Provincial Administration	1425	P	1425	0
Local Administration	3315	P	3315	0
TOTAL	104465		48910	55555

Manufacturing. Food and beverage industries tend to be population-related while other industries are considered to be sensitive to both population and income.

Construction. Employment in this sector is considered to be sensitive to both population and income.

Transportation and utilities. Utilities tend generally to be population-related while the other categories are considered to be sensitive to both population and income.

Trade. Both income and population factors affect trade employment; however, income is likely to have the greatest impact. Therefore, 75 percent of the employment in this industry is considered to be income-related.

Finance and insurance. Again, both income and population factors affect employment in this industry, but income is considered to have the greater impact. Again, 75 percent of the employment in this industry is considered to be income-related.

Services. Education and religious organizations are considered to be population-related. Amusement and recreation and accommodation and food are considered to be income-related. Other service industries are considered to be affected by both income and population equally.

Public administration and defence. Employment in this sector is considered to be population-related.

Total non-basic. In total, Tables D-6 and D-7 indicate a breakdown in income-related and population-related non-basic employment as follows:

- Halton's income-related employment, that which is sensitive to an increase in basic employment even if no new migrants move into the region, accounted for 39,180 jobs or 53.7 percent of total non-basic employment in 1981. Population-related non-basic employment totalled 33,760 jobs.

- Niagara's non-basic employment breakdown is similar with 53.2 percent of the non-basic employment (55,555 jobs) estimated to be income-related and 46.8 percent (48,910 jobs) population-related.

Multipliers for local labour

To the extent that local labour rather than migrant labour fills the jobs created, a multiplier based on the income-related non-basic employment provides a more reasonable estimate of job creation in the non-basic sector than does the multiplier estimated previously (page D-6). These income-related (local) labour multipliers are derived using the following formula:

$$K = 1 + \frac{N_i/E}{1 - N_i/E}$$

- K is the total employment multiplier for non-migrant labour;

- N_i is income-related non-basic employment; and

- E is total employment.

This formula is derived from the employment multiplier formula on page D-6, as follows:

$$K = 1 + \frac{N}{B} = 1 + \frac{N/E}{B/E}$$

Since N/E + B/E = 1 , $K = 1 + \frac{N/E}{1 - N/E}$

Since $N = N_i + N_p$ (the population-related non-basic employment), N_i can replace N when only the income-related effects are being examined.

Applying this total employment multiplier formula to the relevant data for Halton and Niagara yields the following multipliers:

- Halton: $1 + \frac{39{,}180/131{,}055}{1 - 39{,}180/131{,}055} = 1.43$
- Niagara: $1 + \frac{55{,}555/166{,}845}{1 - 55{,}555/166{,}845} = 1.50$

These multipliers assume that all jobs created, both basic and non-basic, are filled by local labour and no subsequent migration into the regions would occur.

To the extent that some, but not all, new jobs are filled by migrant workers, the actual employment multipliers for the new employment created by OWMC facilities will be:

- Halton: between 1.43 (all local labour) and 2.26 (all migrant labour); and
- Niagara: between 1.50 (all local labour) and 2.67 (all migrant labour).

REGIONAL EMPLOYMENT ESTIMATES

The employment multipliers derived in the previous section are applied here to the estimates of direct and indirect employment associated with OWMC facilities at each of the siting options to yield estimates of the total employment impact of OWMC facilities. The estimates are made first for the 300,000 tonne per year processing capacity assumption. An alternative estimate based on a processing capacity of 150,000 tonnes is also presented at the end of this section.

Direct employment

The estimates of direct employment associated with the operation of the facilities (for the 300,000 tonnes per year processing capacity assumption) at the six OWMC siting options are:*

- Halton: both siting options in Halton have estimated direct employment of 217 workers.
- Niagara: siting option LF-1E/PI-27E has estimated direct employment of 217 workers; the other three siting options have estimated direct employment of 221 workers.

Indirect employment

The estimates of the indirect employment associated with the operation of the facilities (for the 300,000 tonnes per year processing capacity assumption) at the six OWMC siting options are:

- Trucking jobs - for the three partially integrated siting options (the two Halton siting options and LF-1E/PI-27E in Niagara), it appears that approximately 15 drivers will be

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[*] Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

needed to transport the inert residues to the landfill site. Taking account of backup drivers, mechanics and supervisory personnel, a total of 20 trucking-related jobs are assumed for these siting options.*

- Site maintenance (lawn mowing, snow removal, etc.) and cleaning staff for the clothing used by OWMC workers are estimated to total five jobs.**

- Utilities expenditures on electricity, gas, water and sewers comprise a large part of OWMC's projected expenditures ($2 million in year ten). An allowance for an additional five jobs associated with the operation and maintenance of the utilities has been included in the indirect job creation estimates.**

Range of total employment impacts

Table D-8 presents the range of total regional employment impacts estimated for each OWMC siting option based on the direct and indirect employment expected to be generated under each siting option. Two extreme estimates are presented for each siting option:

- Total employment impacts assuming all new jobs are filled by migrants from outside the region; and

- Total employment impacts assuming all new jobs are filled by local residents who already live in the region.

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* M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Transportation, 1985.

** Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

TABLE D-8

SAMPLE HIGH AND LOW REGIONAL EMPLOYMENT IMPACTS FOR OWMC FACILITIES UNDER EACH SITING OPTION*

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Basic Employment						
Direct	221	221	221	217	217	217
Indirect	10	10	10	30	30	30
Total	231	231	231	247	247	247
Employment Multipliers						
All Migrant Workers	2.67	2.67	2.67	2.67	2.26	2.26
All Local Workers	1.50	1.50	1.50	1.50	1.43	1.43
Total Employment**						
All Migrant Workers	617	617	617	659	558	558
All Local Workers	347	347	347	371	353	353
Non-Basic Employment						
All Migrant Workers	386	386	386	412	311	311
All Local Workers	116	116	116	124	106	106

* Estimated employment in year 10 of facilities with an annual processing capacity of 300,000 tonnes of special wastes.

** Total employment under the alternative assumptions that: (a) all new jobs are filled by workers who migrate to the region; and (b) all new jobs are filled by local workers already resident in the region.

The difference between the two estimates of total employment is the number of non-basic jobs created since the number of basic jobs is constant. If none of the additional jobs are filled by migrants, the number of non-basic jobs created in the region is less than half the total that would be created if all new jobs are filled by migrants. Clearly, the actual employment impact will be somewhere between the extremes presented in Table D-8 depending on the relative proportions of migrant and local labour employed in both the basic and non-basic jobs.

Migrant versus local workers

Based on discussions with officials of OWMC and Ontario Hydro and the experience of Ontario Hydro with the operation of large capital-intensive industrial facilities, it has been estimated that 60 percent of the employees at OWMC facilities will be comprised of workers already resident in the region where the facilities are to be located.*

To determine what proportion of the non-basic employment created would be local residents, an examination of unemployment and participation rates in each region was undertaken:

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* Two separate analyses were undertaken in this regard: first, a breakdown of estimated OWMC employment by type of job was compared with Ontario Hydro experience regarding the employment of local versus migrant workers in similar types of jobs; second, overall total local/migrant worker ratios for the construction of the Darlington Nuclear Power Plant in the Region of Durham were examined. The first method yielded an estimated local content in the work force of 61 percent. The second indicated that 62 percent of the construction workers already lived in Durham, 24 percent moved to Durham and 14 percent commuted to the site from other regions. These estimates provide a reasonable basis for an assumption on the split between resident/non-resident employment for OWMC facilities.

- Unemployment is relatively high in both regions. While current unemployment data are not available for the Regions of Halton and Niagara, data for the St. Catharines-Niagara Census Metropolitan Area (CMA) shows the unemployment rate for the first half of 1985 was 11.3 percent. Unemployment during the same period was 11.0 percent in the Hamilton CMA and 7.1 percent in the Toronto CMA. The 1981 Census unemployment rate in Halton was between that of the Hamilton and Toronto CMA's so it is expected that the current unemployment rate in Halton would be in the eight to ten percent range.

- Participation rates are relatively low in Niagara. In the St. Catharines-Niagara CMA, the participation rate was 61.5 percent in the first half of this year compared to the provincial average of 67.6 percent. Recent data are not available for Halton, but the 1981 Census participation rate was higher than the provincial average.

Based on this, it was assumed that 60 percent of the non-basic employment generated by the Halton siting options would be accounted for by local residents (the same ratio as for OWMC personnel). For the Niagara siting options, it was assumed that 90 percent of the non-basic employment would be accounted for by local residents due to the greater available local work force.

The appropriate formula for the employment multiplier in the case where some of the employment is local and some is migrant is:

$$K = 1 + \frac{a\left(\frac{N_i}{E}\right) + (1-a)\left(\frac{N_i}{E}\right)}{1 - \left[b\left(\frac{N_i}{E}\right) + (1-b)\left(\frac{N_i}{E}\right)\right]} \quad *$$

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* Harvey Schwartz, A Guide to Regional Multiplier Estimation, pages 95-108.

- K is the total employment multiplier;
- a is the proportion of direct and indirect (basic) employment which will be filled by local residents;
- b is the proportion of non-basic employment which will be filled by local residents;
- N_i is the income-related non-basic employment;
- E is total employment; and
- N is total non-basic employment.

Estimated regional employment impact

Using the formula derived in the previous section and assuming 60 percent local residents for basic employment for all siting options and 60 percent and 90 percent local residents for non-basic employment generated in Halton and Niagara, respectively, the multipliers for each region are:

- Halton: $$K = 1 + \frac{0.6\ (\frac{39,180}{131,055}) + 0.4\ (\frac{72,940}{131,055})}{1 - [0.6\ (\frac{39,180}{131,055}) + 0.4\ (\frac{72,940}{131,055})]}$$

  $K = 1.67$

- Niagara: $$K = 1 + \frac{0.6\ (\frac{55,555}{166,845}) + 0.4\ (\frac{104,465}{166,845})}{1 - [0.9\ (\frac{55,555}{166,845}) + 0.1\ (\frac{58,830}{166,845})]}$$

  $K = 1.71$

Table D-9 presents the estimated regional employment impacts using these multipliers.

Leakages to other regional municipalities

To this point in the analysis, the estimates of regional employment have implicitly assumed that the boundaries in which all of the regional impacts of OWMC facilities would be felt are the same as the boundaries of the regional municipalities in which each of the siting options are located. This convenient assumption simplified the analysis because data was much more readily available on the regional municipality boundaries than on boundaries that would may better define the exact region of influence around each site. Also, it was considered that this simplifying assumption would not substantially alter the conclusions of the analysis, as long as adjustments were made to reflect the fact that not all of the direct and indirect workers will ultimately live in the regional municipality where OWMC facilities locate - some leakages may occur as a result of workers commuting from outside the regional municipality.

For two of the siting options, the implicit assumption appears valid. For example, according to 1981 Census data, residents of the Region of Niagara account for 98 percent of the employment in the City of Niagara Falls; therefore, it is reasonable to expect that siting options LF-1E and LF-1E/PI-27E will experience virtually no leakages of employment to other regions.

For the other siting options, however, some leakage of employment to commuters from other regions appears likely. According to 1981 Census data:

TABLE D-9

ESTIMATED REGIONAL EMPLOYMENT IMPACTS FOR OWMC FACILITIES UNDER EACH SITING OPTION*

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Basic Employment						
Direct	221	221	221	217	217	217
Indirect	10	10	10	30	30	30
Total	231	231	231	247	247	247
Employment Multiplier	1.71	1.71	1.71	1.71	1.67	1.67
Total Employment	395	395	395	422	412	412
Leakages of Basic Employment Employment to Commuters From Other Regions						
Percent	20	10	0	0	20	20
Employment	46	23	0	0	49	49
Basic Employment Resident in Region	185	208	231	247	198	198
Total Employment Resident in Region	316	356	395	422	331	331

* Estimated employment in year 10 of facilities with an annual processing capacity of 300,000 tonnes of special wastes.

- Residents of the Region of Niagara accounted for 90 percent of the employment in West Lincoln, i.e., non-Niagara residents accounted for ten percent of West Lincoln employment; and

- Residents of the Region of Halton accounted for 79 percent of the employment in Milton, i.e., non-Halton residents accounted for 21 percent of Milton employment.

For the remaining four siting options, the following assumptions regarding leakages of employment to commuters have been made:

- For siting option LF-3C, due to its proximity to the Region of Haldimand-Norfolk, it is assumed that 20 percent of the direct and indirect employment is comprised of commuters.

- For siting option LF-9C, it is assumed that ten percent of the direct and indirect employment is comprised of commuters.

- Commuters from other regions to the two Milton siting options (LF-4N/PI-1N and LF-4N/PI-13N) are assumed to account for 20 percent of the direct and indirect employment.

The effects of these assumed leakages are presented in Table D-9. First, the number of basic workers assumed to commute from other regions is estimated for each siting option. Then, estimates of basic employment resident in the region for each siting option are calculated by subtracting commuters from total basic employment. Finally, the total additional employment resident in the region is calculated using the multiplier and the revised estimate of resident basic employment.

Based on this methodology, the estimated amount of additional employment generated by OWMC facilities varies from 316 jobs at siting option LF-3C to 422 jobs at siting option LF-1E/PI-27E - both of these siting options are in the Region of Niagara. For both Halton siting options, the estimated employment generated in the Region as a result of OWMC facilities is 331 jobs.

EMPLOYMENT ESTIMATES FOR SMALLER FACILITIES

The employment impact of facilities with an annual processing capacity of 150,000 tonnes is estimated here to provide a sensitivity test for the estimates presented earlier. The methodology and the employment multipliers derived in previous parts of this appendix are also utilized here.

Direct and indirect employment

Table D-10 presents the estimates of direct and indirect employment of 150,000 tonnes annual processing capacity facilities. As with the larger facilities reviewed in Table D-9, the direct employment estimate is provided by Monenco Limited. The indirect employment estimate applies the same one-third reduction in employment estimated for the reduction in direct employment to the indirect employment for the annual 300,000 tonnes processing capacity facilities.

Total employment resident in the region

The same employment multipliers (1.67 for Halton and 1.71 for Niagara) are applied to the estimates of basic employment in Table D-10 to obtain the estimates of total employment as for the larger facilities in Table D-9.

TABLE D-10

ESTIMATED REGIONAL EMPLOYMENT IMPACTS FOR ALTERNATIVE OWMC FACILITIES UNDER EACH SITING OPTION*

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Basic Employment						
Direct	151	151	151	147	147	147
Indirect	7	7	7	20	20	20
Total	158	158	158	167	167	167
Employment Multiplier	1.71	1.71	1.71	1.71	1.67	1.67
Total Employment	270	270	270	286	279	279
Leakages of Basic Employment Employment to Commuters From Other Regions						
Percent	20	10	0	0	20	20
Employment	32	16	0	0	33	33
Basic Employment Resident in Region	126	142	158	167	134	134
Total Employment Resident in Region	215	243	270	286	224	224

* Estimated employment in year 10 of facilities with an annual processing capacity of 150,000 tonnes of special wastes.

Similarly, the estimated proportionate leakages to commuters from other regions are the same for each siting option as for the 300,000 tonnes annual processing capacity facilities presented in Table D-9.

The total estimated regional employment impact of facilities with a 150,000 tonnes annual processing capacity varies from 215 jobs at siting option LF-3C in Niagara to 286 jobs at siting option LF-1E/PI-27E in Niagara. The estimated regional employment associated with the two siting options in Halton is 224 jobs under this reduced capacity scenario.

COMPARISON WITH OTHER ECONOMIC MULTIPLIER STUDIES

The literature review for this assignment entailed the examination of a large number of studies which utilized economic multipliers to examine the economic impact of a particular project or industry on a region. A list of the economic multiplier studies examined in the course of the literature review is provided in this section along with a brief review of findings.

Following a review of this literature, the methodology described in A Guide to Regional Multiplier Estimation (prepared for the Project Assessment and Evaluation Branch, Department of Regional Economic Expansion in 1982 by Dr. Harvey Schwartz of York University) was adopted as the most comprehensive and appropriate means of estimating the regional impacts of OWMC facilities at each of the six siting options. Many of the studies reviewed utilized methodologies which were considered to be crude compared to the Schwartz methodology.

ECONOMIC MULTIPLIER STUDIES REVIEWED

A cross-section of the studies reviewed in the course of this assignment included:

- Bahnwick and Wright, Slave River Hydroelectric Project: Local Economic Assessment, A study for the Environmental Assessment Division of the Alberta Department of the Environment, 1982. The study examined the economic effects of the Slave River project on Fort Smith, the methodology used is unclear, but the multiplier is in the 1.70 - 2.95 range.

- David Brooks, Economic Impact of Low Energy Growth in Canada: An Initial Analysis, Economic Council of Canada, Discussion Paper #126, 1978.

- Ian B. Currie, An Evaluation of the Impact of a Government Program on the Economy of the Southern Georgian Bay Region, 1983, B.A. Thesis, Sir Wilfred Laurier University. The study found an economic multiplier of 1.2 for the tourist industry in Midland, Ontario.

- Canadian Resourcecon Limited and Inter-Island Coracle Consultation Limited, Social and Economic Impacts of the Western LNG Project, prepared for Dome Petroleum Ltd., 1982. A multiplier of 2.0 of direct operating workforce is used to estimate total employment in Prince Rupert and Port Simpson.

- R.G. Fletcher, Manual for the Analysis and Appraisal of Industrial Projects, Department of Regional Economic Expansion, 1982. The study presents an expansion of the analysis of H. Schwartz in A Guide to Regional Multiplier Estimation with respect to the sizes of multipliers in different sized regions. Larger regions have larger multipliers because the import content of local consumption tends to fall as the size of the region grows. For small regions with less than 25,000 population, the multiplier is about 1.2 when local labour fills all the jobs, and about 1.6 when all jobs are filled by migrant labour. For regions of 100,000 - 150,000 population, multiplier's of about 1.4, when all jobs are filled by local labour, and about 2.3, when only migrant labour fills the new jobs, are likely.

- IBI Group, Town of Newcastle - Darlington Generating Station: Assessment of Impacts, prepared for Ontario Hydro, 1977. An employment multiplier of 1.7 was estimated by the study.

- F. Lazar, Wesleyville and Darlington - Construction Labour Inflow Report, prepared for Ontario Hydro, 1977. Employment multipliers of 1.67 for Darlington and 1.42 for Wesleyville were estimated in this study.

- J.F. MacLaren Ltd., Darlington Generating Station: Community Impact Study, prepared for Ontario Hydro, 1976. The local employment multiplier for construction and operations of 1.2

- J.F. MacLaren Ltd., Wesleyville Generating Station: Community Impact Study, prepared for Ontario Hydro, 1977. The study found an employment multiplier for the local community of 1.2 for both the construction and operating work force.

- C. Nichols and Associates, A Study of Economic Growth in the East Peace Region, 1980. The study examined the expansion of the oil and gas industry in the Peace River Region; regional multipliers in the 1.4 to 1.9 range were estimated from an overall assumed multiplier of 2.0 for Alberta as a whole.

- Ontario Hydro, unpublished material prepared by the Social and Community Studies section in 1984, reviews many employment multiplier studies with the following highlights:

  - employment multipliers for energy projects ranged from 1.05 to 1.9 (construction) and 1.2 to 2.63 (operations);

  - employment multipliers for the agricultural sector ranged from 1.2 to 2.1;

  - in the resource sector, multipliers ranged from 1.1 to 1.9 for mining, to 1.5 to 1.9 for wood products, and to 1.1 to 2.5 for petrochemicals;

  - multiplier calculated by Ontario government programs in 1965 ranged from 1.10 to 2.19;

  - DREE programs in Alberta in 1974 relied on multipliers that ranged from 1.2 to 1.5;

  - multipliers ranged from 1.20 for a population of 500 to 1.59 for a population of 15,000; and

  - employment multipliers in urban centres ranged from 1.30 in centres with population size under 5,000 to 2.30 in centres with populations over 1,000,000.

- Ontario Hydro, Secondary Employment Multipliers: Bruce Nuclear Power Development, 1978. The estimated employment multiplier was in the 1.26 to 1.40 range.

- Ontario Ministry of Tourism and Recreation, Tourism Research Branch, The Economic Impact of Tourism in Ontario and Regions, 1982, 1984. The employment multiplier associated with tourism was estimated at 1.77 for Ontario as a whole. Multipliers for a variety of industries involved in tourism were transportation, 3.11; retail trade, 1.51; amusement and recreation, 2.21; and accommodation and food 1.48.

- Price Waterhouse Associates, British Columbia's Northeast Coal Development, prepared for the B.C. Ministry of Industry and Small Business Development, 1981. An overall Canada employment multiplier of 3.35 for direct employment at the Northeast Coal operations was utilized for the study.

- Proctor and Redfern Ltd., Atikokan Generating Station: Community Impact Study, prepared for Ontario Hydro, 1976. Employment multipliers for the construction work force was 1.05 for single workers and 1.25 for married workers. For the operations work force, the multiplier was 1.51.

- Harvey Schwartz, A Guide to Regional Multiplier Estimation, Department of Regional Economic Expansion, 1982. The study provides a framework for undertaking economic multiplier studies but does not provide an estimate for a specific region.

- L.A. Yeung, Laird River Hydroelectric Project, Preliminary Socio-Economic Impact Analysis, prepared for the Government of British Columbia, 1982. Multipliers of 1.3 for construction and 1.8 for operations were estimated.

APPENDIX E
DESCRIPTION OF HOUSEHOLD IMPACT ESTIMATES

TABLE OF CONTENTS

Page

Introduction E-1

Regional Household Estimates E-1

APPENDIX E

DESCRIPTION OF HOUSEHOLD IMPACT ESTIMATES

INTRODUCTION

This appendix provides estimates of the number of households that would be formed as a result of OWMC facilities in both the area and regional municipality of each siting option. These household estimates are based on the regional employment impact estimates which were presented in Appendix D.

REGIONAL HOUSEHOLD ESTIMATES

REGIONAL EMPLOYMENT IMPACTS

Appendix Table D-9 presented estimates of the total amount of new regional employment which is expected to occur as a result of the location of OWMC facilities with a 300,000 tonnes annual processing capacity at each of the six siting options. These employment estimates were broken down into basic (OWMC facilities and related workers) employment and non-basic (induced) employment.

In addition, as part of the employment estimating methodology, assumptions were made regarding the shares of basic and non-basic employment, respectively, which would be filled by workers already residing in the region and workers migrating to the region.

- For basic employment in both Niagara and Halton Regions, it was assumed that 60 percent of the workers would be local residents and 40 percent would migrate from other areas to live in the Region.

- For non-basic employment in Halton, it was also assumed that 60 percent of the workers would be local residents and 40 percent would migrate from other areas to live in the Region.

- For non-basic employment in Niagara, it was assumed that 90 percent of the workers would be local residents and only ten percent would be migrants since there is a considerably higher unemployment rate and a lower participation rate in Niagara than in Halton.*

Table E-1 presents estimates of regional employment generated by each siting option and estimates of the proportion of this employment filled by migrants to the region and local residents.

REGIONAL MUNICIPALITY HOUSEHOLD GROWTH ESTIMATES

Table E-1 also presents estimates of household growth in each region resulting from the location of OWMC facilities (with an annual processing capacity of 300,000 tonnes) at each of the siting options.

Household growth is expected to occur from two sources:

- Migrants - it is assumed for the purposes of this analysis that the migrant employment results in an equivalent increase

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* The fact that the regional employment impact estimates were revised for some of the siting options (Table D-9) to account for leakages in regional employment to commuters from other regional municipalities should not affect these proportions. The migrant/non-migrant shares were assumed to apply equally to all parts of the "region" defined for the purposes of estimating employment impacts. When commuters from other regional municipalities were subtracted in Table D-9, it was with the implicit assumption that the same migrant/non-migrant ratios applied to them as to those who live in the regional municipality.

TABLE E-1

ESTIMATED REGIONAL EMPLOYMENT AND HOUSEHOLD GROWTH* GENERATED BY OWMC FACILITIES, BY SITING OPTION

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Employment Resident in Region						
Basic	185	208	231	247	198	198
Non-Basic	131	148	164	175	133	133
Total	316	356	395	422	331	331
Migrant Share of Employment (Percent)						
Basic	40	40	40	40	40	40
Non-Basic	10	10	10	10	40	40
Migrant Employment Resident in Region						
Basic	74	83	92	99	79	79
Non-Basic	13	15	16	18	53	53
Total	87	98	108	117	132	132
Non-Migrant Employment in Region	229	258	287	305	199	199
Assumed Proportion of Non-Migrant Employment Resulting in New Household Formation (Percent)	20	20	20	20	20	20
Household Growth in Region						
Migrant	87	98	108	117	132	132
Non-Migrant	46	52	57	61	40	40
Total	133	150	165	178	172	172

* Estimated employment in year 10 of facilities with an annual processing capacity of 300,000 tonnes of special wastes.

in household growth; i.e., all migrant households either have only one income-earner or only one of the income-earners in a migrant household is employed in a job created as a result of OWMC facilities.

- Non-migrants - some of the non-migrant employment will result in new household formation. This is particularly true to the extent that young unemployed people either living with parents or sharing accommodation with others may find either a basic or non-basic job and, with the new income, be able to support a separate household, likely in a rental unit.

Persons aged 15-24 accounted for 37.6 percent of Ontario's total unemployment in the first half of 1985, with a further 26.8 percent being people aged 25-34. These are the prime household formation age groups. It is considered that 30-40 percent of the non-migrant basic and non-basic jobs created by OWMC facilities will be filled by people aged less than 35 years.

The household formation rate for all persons in the 15-34 age group is approximately 30 percent. This figure does not change materially whether the person in this age group is employed or unemployed. It is assumed in this analysis that approximately 30 percent of the people in this age group employed as a result of OWMC facilities will form a new household. For people over 35 years of age, most will already have formed a household. Consequently, it is assumed for this analysis that 15 percent of the people in this age group employed as a result of OWMC facilities will form a new household. When both age groups are combined, it is estimated that 20 percent of non-migrant jobs created in each candidate region will result in the creation of a new household.

The estimates of total household growth resident in each region for each siting option are presented in Table E-1. They vary from a low of 133 households for siting option LF-3C in Niagara to a high of 178 households for LF-1E/PI-27E, also in Niagara. The two Halton siting options would attract an estimated household growth of 172 households.

AREA MUNICIPALITY HOUSEHOLD GROWTH ESTIMATES

The shares of regional household growth expected to be accounted for by the candidate area municipalities are presented in Table E-2 for each siting option.

In each case, the proportion of non-agricultural employment in the area municipality which was filled by employees who also lived in the area municipality at the time of the 1981 Census of Canada was determined. This indicated that:

- In West Lincoln, 64 percent of the persons employed in non-agricultural businesses in the municipality also lived there.
- In Milton, the figure was 57 percent.
- In Niagara Falls, the figure was 81 percent.

The 1981 Census of Canada figure was considered too high for the regional employment resulting from OWMC facilities at all siting options - even considering the allowance made for commuters from other regional municipalities (Appendix D, Table D-9).

- For the siting options in West Lincoln, 50 percent for LF-3C and 40 percent for LF-9C were considered appropriate for West Lincoln's proportion of total regional households generated by OWMC facilities. The lower proportion for LF-9C is due to the assumption of a higher proportion of commuters associated with this siting option.

TABLE E-2

AREA MUNICIPALITY SHARE OF REGIONAL HOUSEHOLD GROWTH GENERATED BY OWMC FACILITIES, BY SITING OPTION

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Total Household Growth in Region*	133	150	165	178	172	172
Share of Area Municipality Non-Agricultural Employment Resident in Area Municipality						
Percent:						
1981 Census Share**	64	64	81	81	57	57
Estimated Site Share***	50	40	70	70	45	45
Household Growth:						
1981 Census Share	85	96	134	144	98	98
Estimated Site Share	67	60	116	125	77	77

* Source: Table E-1.

** Source: 1981 Census of Canada.

*** Source: Estimate by Clayton Research Associates.

- For the Niagara Falls siting options, it is considered that 70 percent of the household growth generated by OWMC facilities in Niagara Region would locate in Niagara Falls due to the proximity of the siting options to the western municipal boundary.

- For the Milton siting options, it is considered that 45 percent of the regional workers would locate in Milton - many would prefer the more developed residential communities of Oakville and Burlington.

Using these proportions, it is estimated that the household growth generated by OWMC facilities in the area municipalities would amount to 60-67 households with the West Lincoln siting options, 77 households with the Milton siting options and 116-125 households with the Niagara Falls siting options.

HOUSEHOLD GROWTH FOR ALTERNATIVE OWMC FACILITIES

Tables E-3 and E-4 present data similar to that presented in Tables E-1 and E-2, respectively, but for OWMC facilities having the capacity to process only 150,000 tonnes of special wastes annually. While the analysis and assumptions are the same in both instances, the household growth estimates are lower under the 150,000 tonnes scenario because of the smaller number of workers at the facilities themselves and being employed in non-basic jobs generated by the facilities.

Under the 150,000 tonnes capacity scenario, estimated household growth in the two Regions varies from 90-120 households for the Niagara siting options to 117 households for the two Halton siting options. In terms of the impact on the area municipalities, the two West Lincoln siting options again have the lowest household growth generated by OWMC facilities (41-45 households compared to

TABLE E-3

ESTIMATED REGIONAL EMPLOYMENT AND HOUSEHOLD GROWTH* GENERATED BY ALTERNATIVE OWMC FACILITIES, BY SITING OPTION

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Employment Resident in Region						
Basic	126	142	158	167	134	134
Non-Basic	89	101	112	119	90	90
Total	215	243	270	286	224	224
Migrant Share of Employment (Percent)						
Basic	40	40	40	40	40	40
Non-Basic	10	10	10	10	40	40
Migrant Employment Resident in Region						
Basic	50	57	63	67	54	54
Non-Basic	9	10	11	12	36	36
Total	59	67	74	79	90	90
Non-Migrant Employment in Region	229	258	287	305	199	199
Assumed Proportion of Non-Migrant Employment Resulting in New Household Formation (Percent)	20	20	20	20	20	20
Household Growth in Region						
Migrant	59	67	74	79	90	90
Non-Migrant	31	35	39	41	27	27
Total	90	102	113	120	117	117

* Estimated employment in year 10 of facilities with an annual processing capacity of 150,000 tonnes of special wastes.

TABLE E-4

AREA MUNICIPALITY SHARE OF REGIONAL HOUSEHOLD GROWTH GENERATED BY ALTERNATIVE OWMC FACILITIES, BY SITING OPTION

	Niagara				Halton	
	LF-3C	LF-9C	LF-1E	LF-1E PI-27E	LF-4N PI-1N	LF-4N PI-13N
Total Household Growth in Region*	90	102	113	120	117	117
Share of Area Municipality Non-Agricultural Employment Resident in Area Municipality						
Percent:						
1981 Census Share**	64	64	81	81	57	57
Estimated Site Share***	50	40	70	70	45	45
Household Growth:						
1981 Census Share	58	61	92	97	67	67
Estimated Site Share	45	41	79	84	53	53

* Source: Table E-3.

** Source: 1981 Census of Canada.

*** Source: Estimate by Clayton Research Associates.

60-67 households for the larger facilities) and Niagara Falls has the greatest household growth generated (79-84 households compared to 116-125 households for the larger facilities). Milton's household growth for the smaller facilities is estimated at 53 households compared to 77 households for the larger facilities.

APPENDIX F
DESCRIPTION OF INDUSTRIAL IMPACT ANALYSIS

TABLE OF CONTENTS

Page

Purpose F-1

Principles of Industrial Location F-2

Characteristics of Existing Industrial Districts in the Candidate Area Municipalities F-5

OWMC Facilities Characteristics F-14

Potential Impact of OWMC Facilities on Existing Industrial Districts of Candidate Area Municipalities .. F-16

Conclusions F-21

Addendum: Hazardous Waste Management Facility Siting and the Location of Related Economic Activities AF-1

APPENDIX F
DESCRIPTION OF INDUSTRIAL IMPACT ANALYSIS

PURPOSE

The purpose of this appendix is to consider the extent to which OWMC facilities will have the potential to generate spin-off industrial growth in the area municipalities. It addresses the question: can waste treatment facilities, representing a $192 million investment, be an impetus to other industrial development in its vicinity?

The appendix is broken into five sections which correspond to the steps of the analysis:

- From an examination of industrial location principles, two external effects of OWMC facilities are identified for detailed consideration;

- The characteristics of existing industrial districts of the candidate area municipalities are reviewed in relation to their municipal service infrastructure, the nature of their current industrial activities and their expansion history;

- The industrial characteristics of the special wastes treatment facilities, including their requirements for service infrastructure, are considered;

- The potential impact of OWMC facilities on the existing industrial parks is assessed in relation to the industrial location principles noted above; and

- Conclusions are reached as to the possible impacts of OWMC facilities on the industrial districts of the candidate area municipalities.

The only industrial impacts considered in this appendix are those that may be expected with OWMC facilities processing 300,000 tonnes of special wastes in the tenth year of operation.

PRINCIPLES OF INDUSTRIAL LOCATION

The aim of this appendix is to consider the range of industrial opportunities which may result from the selection of the location for OWMC facilities.

Industrial activities are defined to include most businesses that locate on industrial land and have linkages with other businesses. While manufacturing and warehousing occur with the greatest frequency, construction, transportation and service firms also locate on industrial land.

Attention is restricted to considering the effects of OWMC facilities on currently-zoned and designated industrial districts as the Official Plans of the candidate area municipalities restrict industrial activities to these areas.

The literature on spin-off impacts of industrial development tends to break down into a consideration of the "push" and "pull" effects of the new investment:*

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* Alonso, W.,"Industrial Location and Regional Policy in Economic Development", in Freedman, J. and Alonso, W., Regional Policy Readings in Theory and Applications, 1978.

THE PULL FORCES

The principal types of pull forces drawing firms together at one location are the linkages created with other industrial firms and the increased attractiveness of an industrial district due to improved infrastructure investment.

- Industrial linkages. A linkage occurs when related activities are attracted to the same general location because they use the same raw materials, they are major suppliers or they use the same services. In this fashion, an industrial assemblage can be created where firms use the same processes and participate in the same sequence of operations. A classic example of industrial linkage occurs with an automobile assembly plant when it attracts components suppliers to its general vicinity.*

  Four common types of industrial linkage are identified in the economic literature: vertical linkage (the interrelationship of separate firms that each form a stage in a series of operations); horizontal or lateral linkage (separate parts are assembled into an automobile, for example); diagonal linkage (a firm which makes a product, such as machine parts, or provides a service at various stages of production); and common roots linkage, where firms use in common the processes, services or skills provided locally which are not available elsewhere to any significant extent.

- Infrastructure investment. Another force that can draw firms to one location is the infrastructure investment that a municipality, or another firm, undertakes to open up an area for development. When a firm pioneers a new industrial district, a municipality usually sizes the hard services (notably the water and sanitary sewer pipes) to meet anticipated future requirements. Surveys show that when presented with a choice, industrialists select fully-serviced, compatible industrial districts by a two to one margin over partially serviced or unserviced areas.*

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* Estall, R.C. and Buchanan, R.O., Industrial Activity and Economic Geography (London, 1969).

THE PUSH FORCES

Whereas there are forces drawing compatible firms together, there are also competing forces that tend to discourage the juxtaposition of incompatible firms. In the industrial land market, like the residential land market, neighbours are important.

An industrial firm needs to function without hindrance. An example of the functional separation of incompatible industries occurs in the City of Niagara Falls. Heavy steel and chemical activities are centred in the North-East Industrial District of this city while food processing firms are concentrated in the Central Industrial District. Chemicals and food processing are not compatible industrial activities, due to the potential emissions of the former.

Municipalities recognize these push and pull forces by restricting heavy industries (noisy, hazardous and potentially polluting industries, with extensive outside storage) to particular areas, while zoning land near expressways and housing for clean, showcase types of industry that do not have an unsightly outside storage area. In a heavy industrial area, unsightly uses such as auto wrecking yards and transportation terminals are often found. In the showcase areas, offices are frequently interspersed with clean industries.

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* Employers' Council of British Columbia, Limitation and Attraction of British Columbia for Industry, Table 10; and the North Pickering Project, Location and Site Requirements of Secondary Industry, page 10.

Frequently an "anchor" industry establishes an industrial district and is a "pattern former" for the subsequent industrial growth.* Smaller industrial activities tend to follow the pattern set by the large firms, being pulled to that location by the availability of materials, labour, markets and services, and by being pushed from other areas where there are incompatibilities.

Whereas the push effects that tend to repel incompatible industries are less obvious than the pull effects that draw compatible industries together, they are important when considering the overall positive and negative implications of an industrial location decision.

CHARACTERISTICS OF EXISTING INDUSTRIAL DISTRICTS IN THE CANDIDATE AREA MUNICIPALITIES

Characteristics of existing industrial districts in the candidate area municipalities are presented here so that these industrial areas can be measured against the potential opportunities, as well as the potential constraints, presented by OWMC facilities.

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* Estall and Buchanan, op.cit.

INVENTORY OF INDUSTRIAL DISTRICTS

Milton

There are 772 hectares of designated industrial land in the Town of Milton, according to the Official Plan.* Of this industrial land, approximately one-third is located south of Highway 401 and two-thirds is located in the new Milton 401 Industrial Park. For every hectare of occupied industrial land, Milton has six vacant hectares (Table F-1).

TABLE F-1

DESIGNATED INDUSTRIAL LAND BY DISTRICT AND STATUS
TOWN OF MILTON, 1984, HECTARES

Industrial Area	Total Designated 1984	Total Occupied 1977	Growth 1977-1984	Total Occupied 1984	Total Vacant 1984
CNR-Bronte Street	22	11	0	11	11
CPR-Main Street	115	37	5	42	73
South-East, #401 and #25	103	20	10	30	73
401 Industrial Park	532	15	8	23	509
Total	772	83	23	106	666

Note: (1) Extractive industries on the Niagara Escarpment have been excluded.
(2) Industrial lands refer to areas within and immediately adjacent to the urbanized core of the Town of Milton.

Source: Air photo interpretation.

There are four separate industrial areas in the Milton urban area. Three are south of Highway 401 and the fourth is the new Milton 401 Industrial Park:

- About two kilometres to the north-east of candidate site LF-4N, and four kilometres to the north of PI-1N, is the small, 22 hectare Canadian National Railway-Bronte Street industrial area. The largest industrial operations located here are Reliance Products Limited (a plastics manufacturer with 120 employees) and Canadian Meter Company (manufacturing

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* Official Plan for the Milton Planning Area, 1977 Consolidation, Figure E.

100 employees). Also in this industrial district is an AMC-Jeep-Renault dealership (with ten employees).* Other small retail uses include a propane and a lumber dealer.

In 1984, half this industrial area was comprised of vacant land and there had been no industrial growth during the previous seven years.

- The 115 hectare Canadian Pacific Railway-Main Street industrial area is comprised of two industrial areas (71 hectares on the east edge of the urban core and 44 hectares on the west) focussed on the CPR rail line. Construction, packaging and the manufacturing of plastics and security systems are the principal employers here. The largest employer is Rockwell International of Canada (a manufacturer of suspension systems) with 190 employees.

  In 1984, the CPR-Main Street area was the largest industrial district in the Town of Milton in terms of occupied industrial land (42 hectares). However, almost sixty percent of this district was vacant in 1984.

- In the 103 hectare industrial area south of Highway 401 and east of Highway 25, the largest activity is a correctional institute. Small firms are engaged in the manufacture of stainless steel tanks, wholesaling and construction.

  This industrial area is the second largest occupied industrial area in Milton with 30 occupied hectares in 1984. During the previous seven years, it had accommodated almost half the Town's industrial growth (ten hectares out of a total of 23 hectares).

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* Employment for large industrial employers are from the Halton Industrial Directory, 1984.

- The industrial area located the greatest distance from the candidate sites is the Milton 401 Industrial Park. This district is situated generally to the north of Highway 401, although there is a portion west of Highway 25 and south of Highway 401.

  While this 532 hectare industrial district has good accessibility to a 400 series highway, it has a key limitation since the Town of Milton has severe servicing constraints. While a portion of the first phase of development of the park will be on full municipal services (municipal water and sanitary sewer), there are restrictions on the amount of water an industry can use. Consequently, "dry" industrial activities are expected to locate in the district (e.g., warehousing, transportation terminals and steel fabricating).* A characteristic of "dry" industries is that they are not generally intensive developments and the number of employees per hectare is relatively low. A portion of the first phase of this new industrial park is on partial services (municipal water but no sewer service).

  Currently, the largest industry in the park is Frankel Steel Limited (299 employees) located in the northern section. Partially related to the servicing constraints, no new industries located here between 1981 and 1984.** Between 1977 and 1980, however, an industrial expansion of eight hectares was recorded and, in 1985, a new high-tech industry, Magna International, was under construction in the south-west portion of the district.

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* Implementation Policy, Milton 401 Industrial Park, 1981.

** Interview with the chief administrative officer, Town of Milton, 1984.

West Lincoln

In 1965, the Township purchased a 90 hectare tract near the railway line in the settlement of Smithville and serviced it with municipal well water and sanitary sewers. This is West Lincolns only designated industrial area. The largest firm is General Refractories of Canada (a processor of natural minerals with 104 employees). Other firms include relatively dry industries like concrete and tubular products manufacturers, another refractory and agricultural related businesses such as a fertilizer producer, a grain elevator and a winery.

TABLE F-2

DESIGNATED INDUSTRIAL LAND BY STATUS
TOWNSHIP OF WEST LINCOLN, 1984, HECTARES

Industrial Area	Total Designated 1984	Total Occupied 1981	Growth 1981-1984	Total Occupied 1984	Total Vacant 1984
Smithville Industrial District	92	55	0	55	37

Source: Regional Municipality of Niagara, Industrial Land Survey Atlas and air photo interpretation.

Currently, there are 37 vacant hectares in this municipal industrial park. In the three years prior to 1984, no new industries located in this industrial district. While all vacant sites can be serviced by water, sewer, gas and hydro, there is a servicing constraint in Smithville due to the limited capacity of well water and its sanitary lagoon system.*

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* Niagara Industrial Directory, 1984 and an interview with the Township Clerk, 1984.

Due to these servicing constraints, the Smithville industrial district will continue to attract relatively dry industries that are not heavily reliant upon water for processing purposes. The limited water and sewer services in West Lincoln are not sufficient to accommodate an industrial activity such as OWMC facilities without substantial investment.

Niagara Falls

The City of Niagara Falls has 1,585 hectares designated or zoned for industrial purposes. For every hectare of occupied industrial land, Niagara Falls has two vacant hectares (Table F-3).

TABLE F-3

DESIGNATED INDUSTRIAL LAND BY DISTRICT AND STATUS
CITY OF NIAGARA FALLS, 1984, HECTARES

Industrial District*	Total Designated 1984	Total Occupied 1976	Growth 1976-1984	Total Occupied 1984	Total Vacant 1984
North-East	223	149	28	177	46
Central	210	88	12	100	110
QEW South	114	15	1	16	98
South-East	463	105	19	124	339
South-West	1,044	322	8	330	714
South Welland River	304	23	3	26	278
Total	2,358	702	71	773	1,585

* South Welland River is not designated as an industrial district under the 1982 City of Niagara Falls Official Plan.

Source: City of Niagara Falls Official Plan and air photo interpretation.

This land is situated in six industrial districts. Their characteristics are as follows:

- Heavy industries dominate the North-East Industrial District, which is located adjacent to the city's central business district, and include: Cyanamid Canada's Niagara Plant (a calcium reagents processor with 265 employees), Amca Heavy Equipment Limited (an overhead electrical cranes manufacturer with 285 employees), Abex Industries Limited (a railway track equipment manufacturer with 170 employees) and Dresser Canada

Inc. (an artificial abrasives processor with 154 employees). The North-East Industrial District is a good example of the concentration of compatible, heavy industries, where the noise and emissions of one activity do not disrupt the operation of another.

The North-East Industrial District is the most fully developed industrial area of the city, with only 21 percent of its designated land being vacant (Table F-3). With 177 hectares occupied by industry, it was the second largest industrial district in the city in 1984.

- The Central Industrial District, situated between the Queen Elizabeth Way and the tourist commercial district, also has a distinctive specialization of compatible industries, notably food processing, as well as souvenirs for the tourist trade (including Linnhome Giftware & Souvenirs Limited with 160 employees). The food processors include Nabisco Brands Limited (breakfast cereals, 300 employees), Canadian Home Products Limited (Chef-Boy-Ar-Dee foods, 240 employees), Gerber (Canada) Inc. (baby foods, 183 employees) and T.G. Bright and Company Limited (wines, 108 employees).

  There were 100 hectares of occupied industrial land in the Central Industrial District in 1984 and 110 hectares of vacant land (Table F-3).

- The QEW South Industrial District flanks the Queen Elizabeth Way for three kilometres from the Central Industrial District to an area adjacent to candidate site PI-27E. It contains a number of small industries specializing in the manufacturing of paints, concrete and steel. The industry closest to PI-27E is Modern Exposaic (21 employees), which manufactures pre-cast concrete.

Only 16 hectares of the total 114 hectares are currently developed for industrial purposes. The remaining land area is vacant.

- The South-East Industrial District has four large industries and a large number of smaller operations. The primary activities are located on Stanley Avenue and Portage Road: Norton Company (an abrasives and refractories processor with 415 employees), Oneida Canada Limited (a manufacturer of silver cutlery with 185 employees), Carborundum Abrasives Inc. (a bonded and coated abrasives processor with 155 employees) and Sohio Electrical Minerals Company (an abrasives processor with 114 employees). Located among these industrial activities is Niagara Falls' largest theme park, Marineland and Game Farm.

  In the centre of this industrial district there are a large number of medium sized firms employing from 20 to 100 people, with a notable specialization in machine tools. In the South-East Industrial District, 124 hectares out of the total 463 designated hectares have been occupied.

- The South-West Industrial District is immediately north of the Welland River and the southern portion of this district falls within the site vicinity of candidate site PI-27E. The largest industrial employer here (and the largest in the City of Niagara Falls) is Cyanamid Canada Inc. (Welland Plant) with 690 employees. It produces industrial and agricultural chemicals and synthetic fibres. West of the Cyanamid plant, in the Town of Thorold, is B.F. Goodrich Canada Inc. (a manufacturer of polyvinylchloride resins with 196 employees).*

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* The land area of this plant is not included in the data in Table F-3 because it is located in an adjacent municipality.

Both in terms of total area (1,044 hectares) and in terms of developed area (330 hectares), the South-West Industrial District is the largest in the City of Niagara Falls. The extent of the developed area is mainly due to the large area occupied by the Cyanamid operations.

- The industrial area south of the Welland River has the third largest industrial employer in the city, The Ford Motor Company glass plant, which employs 390 persons. This industrial area is immediately across the river from the South-West Industrial District described above. Ninety-one percent of the zoned land is vacant in the industrial district south of the Welland River.

  Candidate site PI-27E is located in this area. Other activities here include "dry" industries such as a trucking firm and a warehouse.

INDUSTRIAL GROWTH AND DEVELOPMENT

Industrial expansion slowed considerably in the late 1970s and early 1980s compared to the performance in the early years of the 1970s (Table F-4). Between 1971 and 1979, the average annual expansion on industrial land in Niagara Falls was 23 hectares per year. This pace of growth slowed to nine hectares per year during the 1976 to 1984 period.* In the former period, expansion of industry land averaged five hectares per year in Milton and declined to three hectares per year during the late 1970s and early 1980s whereas the Smithville Industrial District in West Lincoln had some early success. In recent years, however, no new industries have located in this district.

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* Measurements were taken from air photos of Niagara Falls for these two dates. The air photos for 1979 were not available to allow for a direct comparison with the data calculated by Woods Gordon.

TABLE F-4

AVERAGE ANNUAL EXPANSION OF INDUSTRIAL LAND 1971-1984, HECTARES

	1971-1979	Late 1970s Early 1980s*
City of Niagara Falls	23	9 (1976-1984)
Town of Milton	5	3 (1977-1984)
Township of West Lincoln	'low'	0 (1981-1984)

* The availability of air photos conditioned the choice of these dates.

Source: Woods Gordon, Economic Development Strategy of the Region of Niagara, 1980 and Tables F-1, F-2 and F-3.

The direction of industrial growth in all three area municipalities appears to be away from locations of the candidate sites: the Milton 401 Industrial Park is being developed at the northern edge of Milton while candidate sites LF-4N, PI-1N and PI-13N are to the south of the urban area; the Smithville Industrial District is some 20 kilometres north of the two candidate sites in West Lincoln (LF-3C and LF-9C); and in Niagara Falls, 43 percent of the industrial growth during the 1977 to 1984 period was in the South-East Industrial District, 36 percent occurred in the Central and North-East Industrial Districts while only three percent occurred adjacent to candidate site PI-27E (Table F-3).

OWMC FACILITIES CHARACTERISTICS

THE OWMC FACILITIES*

OWMC special waste treatment facilities contain three principal components: an incinerator plant; a physical/chemical treatment and solidification plant; and an engineered landfill.

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* The information presented in this section is based largely on Monenco Limited, Facility Design, 1985.

The rotary kiln involves a structure of some 60 metres by 110 metres by 23 metres high. It also has a 60 to 100 metre stack. The physical/chemical treatment and solidification plant involves an equally large structure of 57 metres by 117 metres by 24 metres high. There are storage tanks associated with the physical/chemical tank storage (the majority are enclosed in a building) and storage tanks associated with the incinerator and truck wash buildings (the majority are free-standing and visible). There are also administrative and other buildings in the complex.

Due to its size and function, its need for outdoor storage, along with the release of emissions and noise, many municipalities would probably classify a waste treatment facility, for zoning purposes, as heavy industrial.*

OFF-SITE SERVICES

Table F-5 presents the source of off-site servicing for the incinerator and the physical/chemical treatment and solidification plant for the various siting options. Only the Niagara Falls siting options offer the potential of easy access to municipal water and sanitary sewer pipes.

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* The majority of the facilities reported in OWMC, European Tour, 1982, are located in heavily industrialized regions: Re-Chem, Limay, AVR and Bayer. This tour was not a systematic visitation to every comparable facility, however.

TABLE F-5

DISTANCE OF PHYSICAL/CHEMICAL PLANT AND INCINERATOR TO NEAREST OFF-SITE SERVICES, BY SITING OPTION, KILOMETRES*

	West Lincoln		Niagara Falls		Milton	
	LF-3C	LF-9C	LF-1E	LF-1E/PI-27E	LF-4N/PI-1N	LF-4N/PI-13N
Utilities						
Potable Water	2 from Welland River (treatment of river water required)		6 (to municipal main currently north of Welland River)	2	9 (from Halton Region to the South)	Treatment of adjacent Oakville Creek water
Natural Gas	Not Available		4	Adjacent	1	5
Electric Power	Adjacent	3	2	Adjacent	Adjacent	1
Telephone	Adjacent		Adjacent		Adjacent	

* Rounded to the nearest kilometre.

Source: Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

POTENTIAL IMPACT OF OWMC FACILITIES ON EXISTING INDUSTRIAL DISTRICTS OF CANDIDATE AREA MUNICIPALITIES

The potential impact of OWMC facilities on industrial spin-off development is considered from the perspective of the push and pull forces described previously.

THE PULL FORCES

Industrial linkages

The potential for OWMC facilities to form direct industrial linkages with other industrial activities was considered by another member of the site selection team, Dr. Howard Stafford, of the Institute of Environmental Research. The highlights of his paper Hazardous Waste Management Facility Siting and the Location of Related Economic Facilities, which is attached as an addendum to this appendix, are as follows:

- Although little is known about the impact of a hazardous waste treatment plant on associated economic activities, the linkage effects are likely to be small.

  Since OWMC will be solidifying in concrete the inert waste products of the incinerator and the physical/chemical treatment process and then burying the wastes, there is little likelihood at this time of the facilities attracting industries that can use the residues of OWMC's processes.

  Whereas it might be possible for other activities to use the surplus steam from the incinerator during the summer months, the facilities will need all its available steam for heating during the winter months. Thus, an all-year supply of a by-product, steam, does not appear to be feasible as an industrial attractor.

  According to the transportation consultants of the site selection team, the special wastes which will be directed to OWMC facilities are already being transported in Ontario (frequently to unacceptable locations) and the construction of OWMC facilities should not in themselves create additional transportation - related employment or business.*

  In relation to OWMC's need for chemicals and reagents for its processes, only a small amount if its purchases is expected to be made in the candidate municipality. Of the $14 million annual purchase of chemicals and reagents, 84 percent of these purchases are expected to be made from suppliers in the Toronto Census Metropolitan Area (CMA), or from areas east of the Toronto CMA. The miscellaneous consumables (lubricants, filters, etc.) may be purchased locally. However, they constitute only one percent of the expected annual purchases ($182,000) of the facilities and do not represent a significant impetus for local industry.*

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* See M.M. Dillon Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Transportation, 1985.

- Lower waste disposal costs are not a convincing reason for a waste generator to select a site adjacent to the facilities.

  Stafford advances two reasons for this conclusion: first, in the industrial location studies he surveyed, environmental concerns were never important in the siting of new industry; and secondly, since the transport of hazardous wastes was not a significant expense, it would not of itself dictate a location near disposal facilities. In addition, since more companies are treating their own wastes, Stafford believes there is will be less likelihood in the future for a waste treatment facility to be an attractor of waste generating activities.

- Rather than an industry being attracted to a waste processor, a waste processor is attracted to the regions where the hazardous wastes are produced.

  In this fashion, OWMC selected the Golden Horseshoe region of Southern Ontario as an area in which to search for candidate sites in Phase 3 of the site selection process, since the majority of the liquid and hazardous wastes in Ontario originate from this region.

According to Stafford's analysis, there is little likelihood of encountering vertical, horizontal or diagonal linkages between OWMC facilities and other associated activities.

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* See Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

These conclusions were confirmed through telephone interviews conducted by the Institute of Environmental Research with government agencies and special waste operators. They indicated in general that special wastes facilities would neither attract nor repel significant industrial activity. Opinions expressed at an OWMC sponsored workshop in June, 1984 also confirmed this view. It should be noted, however, that evidence from both these sources is anecdotal and impressionistic and is not based on controlled observation. A literature review conducted by Clayton Research Associates in the fall of 1983 failed to uncover clear documentation on the location implications of waste treatment facilities.

However, there exists the possiblity of some common roots linkages occurring in Niagara Falls (with a common roots linkage, industries depend on a common pool of specialized skilled labour). In Niagara Falls, there is a large labour force, both employed and unemployed, with direct experience (gained through employment in the chemical industry) handling toxic materials.

Infrastructure improvements

In order to operate, OWMC facilities will probably have to be linked to some utilities. The spatial arrangements of these connections are described in further detail.

Milton. The proposed sites for the incinerator and the physical/chemical treatment and solidification plant are located four to nine kilometres to the south of the existing industrial areas of the Town. If the facilities were to locate in Milton, water service could be brought to the site from the south (Table F-5). However, this infrastructure investment would not improve the existing industrial areas of Milton (which are currently limited by their lack of servicing capacity) because of their distance from the candidate sites.

West Lincoln. The candidate sites are located 20 kilometres to the south of the existing industrial area of Smithville. If OWMC were to choose one of these siting options, water service could be supplied through a private system linked to the Welland River to the south. Again, due to the sites distance, the provision of this infrastructure would not improve the existing Smithville Industrial District which has a limit on its servicing capacity due to its small lagoon system.

Niagara Falls. One of the candidate sites in the city, PI-27E, is south of the Welland River in an area zoned as industrial. Although water service is available to the warehouse located on site PI-27E and to the Ford Motor Company's glass plant, the four inch main is not sufficient for OWMC's requirements (the Ford plant uses virtually all current capacity of the pipe).* If OWMC were to choose site PI-27E for the incinerator and the physical/chemical treatment plant, or select LF-1E for the integrated facility, it could obtain water and sewer service from the municipal pipes north of the Welland River. By extending these pipes south of the river, and by oversizing them for other industrial users, this infrastructure could service a large area of industrial land in the City of Niagara Falls.

PUSH EFFECTS

The push effects relate to the forces which act to separate incompatible activities.

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* See Monenco Limited, Site Selection Process Phase 4A: Selection of a Preferred Site(s) - Engineering, 1985.

In the business survey described in Appendix B, businesses within two kilometres of the siting options were surveyed for their reaction to the possible arrival of OWMC facilities. Based on their responses, each firm was described as being negatively affected, positively affected or not affected by the presence of OWMC facilities. Since the three large businesses near PI-27E in Niagara Falls (The Ford Motor Company, Cyanamid Canada and B.F. Goodrich), were described as being positively affected there is an overwhelming ratio of positively affected employment to negatively affected for this site (Table F-6). Thus, the presence of waste disposal facilities appears to be compatible with the existing major industries. Rather than being pulled to this area to suit waste disposal needs, OWMC facilities would locate in this area at a distance from less compatible industries in the city (the "push" effect).

TABLE F-6

EMPLOYMENT IN SITE VICINITY BUSINESSES AFFECTED BY THE PRESENCE OF OWMC FACILITIES CANDIDATE SITES, 1984

Candidate Site	Employees: Businesses Positively Affected	Employees: Businesses Negatively Affected
LF-4N	125	30
PI-1N	0	23
PI-13N	4	61
LF-9C	3	9
LF-3C	0	69
PI-27E	1,448	52
LF-1E	2	18

Source: Appendix B.

CONCLUSIONS

The possible external effects of OWMC facilities on industrial development in the area municipalities are as follows:

° For the four siting options in Milton and West Lincoln, no positive linkages associated with OWMC facilities were identified in either municipality. Since the investment in infrastructure would bring services from the south of these siting options, at some distance from existing industrial areas, no benefits were identified from the public investment in this infrastructure. In relation to the push forces, the construction of waste treatment facilities would not appear compatible with the rural activities in the immediate vicinity.

- For integrated siting option LF-1E in the City of Niagara Falls, no horizontal, vertical or diagonal linkages were determined in relation to OWMC facilities. However, there exists the possibility of a common roots linkage with the common pool of labour associated with chemical industries in the city.

  While there is the possibility of servicing an existing industrial area that currently lacks services (due partly to the barrier formed by the Welland River), the location of OWMC facilities on this siting option would not be compatible with adjacent activities, which are predominantly rural in nature.

- Some common roots linkages are possible for partially integrated siting option LF-1E/PI-27E in Niagara Falls. Choosing this siting option could also bring more municipal water service south of the Welland River to service the PI-27E site and industrial land in the vicinity. The incinerator and the physical/chemical treatment and solidification plant also appear compatible with two of the three largest industries of the City of Niagara Falls, which are in the vicinity. Therefore, both push and pull forces were identified for this siting option which might encourage spin-off types of development.

The conclusion of this analysis is that the development of candidate site PI-27E in Niagara Falls (with an incinerator and a physical/chemical treatment and solidification plant) has the greatest potential for positive industrial impacts, followed by an integrated facility on LF-1E. No positive spin-off effects for further industrial growth were identified for the siting options in Milton or West Lincoln.

ADDENDUM

HAZARDOUS WASTE MANAGEMENT FACILITY SITING AND THE LOCATION OF RELATED ECONOMIC ACTIVITIES

Dr. Howard Stafford

HAZARDOUS WASTE MANAGEMENT FACILITY SITING AND THE LOCATION OF RELATED ECONOMIC ACTIVITIES

The location of any economic activity may be expected to have some impact on the overall economy of the local area immediately surrounding the chosen site, and on the larger regional system. The impacts may be direct and/or indirect, positive and/or negative, short run and/or long run. In order to ascertain the likely effects on the area and region in which a Hazardous Waste Management Facility (H.W.M.F.) is sited, several persons expert in the field have been interviewed and a search of the relevant literature has been conducted. The predominent impression from these investigations is that little is surely known. This may be the most revealing result of the research. The lack of information and firm opinions and the paucity of empirical evidence suggest that the economic "multiplier" effects of H.W.M.F. are minor; if the effects were deemed major then more may reasonably expected to be known.

The information gleaned from the interviews and literature search, however, makes it possible to advance conjectures on the inpacts of off-site H.W.M.F. on the local and regional economies regarding:

1. ECONOMIC SYSTEM EFFICIENCIES. The closer a H.W.M.F. site to the generators of the waste, the greater the savings in waste transportation costs. Generators (usually manufacturers) with disposal sites nearby may be expected to have lower costs than those less favourably located. Other things being equal, lower cost producers will be more competitive, thus regions with adequate disposal facilities may be economically enhanced. However, it is likely that these positive effects are relatively insignificant because (a)

hazardous waste transportation costs (e.g., between $1.50 and $3.00 per mile per 6,000 gallon or 80 drum truck load, round trip [USEPA, 1980]) are a small proportion of total industrial operating costs; (b) most hazardous wastes are treated "on-site" by industrial generators (estimates range from 77% [USEPA, 1980] to 95% [The Wall Street Journal, August, 1983]), so the transport savings for the bulk of wastes are eliminated; (c) the potential regional advantages are mitigated by the fact that every major producing area in the U.S. has existing treatment facilities so no region has a distinct advantage.

2. DIRECT EMPLOYMENT/INCOME CREATION. In terms of workers employed on site, a H.W.M.F. is typically a small business. Any minor impacts of employment creation on the regional economy are further reduced by virtue of the "non basic" nature of the business; as a service activity much of the income is simply recirculating in the region rather than representing fresh funds from outside.

3. INDIRECT EMPLOYMENT/INCOME CREATION; THE ATTRACTION OF INDUSTRY. No evidence has been uncovered which suggests that a H.W.M.F. is a large consumer of local goods or services. They do not produce products which are linked either forward or backward in the economic system. In these respects a disposal operation cannot be expected to have an appreciable impact on regional employment or income.

The claim is sometimes made by proponents of a H.W.M.F. that an off-site operation will attract new manufacturing activity to the area. No references or empirical data have been discovered to confirm this assertion. Circumstantial evidence suggest that there probably is not much substance to it:

A. Recent studies of the effects of environmental regulations on industrial location reveal that environmental concerns are generally of minor influence in the decision of where to place a new manufacturing plant (Duerksen, 1983; Harris, 1983; Stafford, 1983). The traditional location variables, especially markets and labor, are still paramount. Even for operations with significant effluent concerns, environmental regulations rarely rank above mid-level importance. Furthermore, in those cases where environmental concerns were mentioned, air and water related issues were predominent. In detailed responses from 162 manufacturing decision makers involved in site selection, no mention was made of the necessity or desirability of locating near a hazardous waste disposal facility (Stafford, 1983).

B. As noted above, the vast majority of hazardous waste volume generated by manufacturers is treated at the site of generation, on company property. This is especially so for the largest generators. For those wastes which do go to "offsite" facilities, the effective travel range is in excess of 100 miles. Thus, there is little need to locate a plant very near a H.W.M.F. in the absence of other compelling location forces.

C. Hazardous Waste Management Facilities choose locations as near as possible to their markets (Wittle, 1981; Bauer, 1983). There is a high positive spatial correlation between major areas of hazardous waste generation and the locations of treatment facilities. As Cahill and Holman note, "...successful siting attempts are generally characterized by situations in which waste generating industries are crucial to the economic viability of the region" (1981, p.93). Judge Doherty when ruling in favor of IT Corporation's request to construct and operate a hazardous waste facility in Ascension

Parish, Louisiana, remarked that "...while industrial plants in Ascension Parish and adjoining areas furnish jobs and markets, they also produce hazardous wastes which must be taken care of ...The current haphazard method of disposal has resulted in numerous unsafe dumps and has created environmental problems on a large scale. In the court's opinion the development of the regional waste facility is sound and desirable" (Save Ourselves, Inc. vs. Louisiana Environmental Control Commission, January 27, 1982, p.18). The dynamic is that H.W.M.F. are drawn to sites within their market areas. There is no evidence which indicates that the reverse is true. Of itself, without massive aid from the controlling location attributes, the siting of a H.W.M.F. cannot be expected to draw new industrial activity to an area.

CONCLUSION

The establishment of a modern, safe and efficient Hazardous Waste Management Facility in an area which generates sufficient quantities of such waste can be of value to the area. Handling and disposal practices probably will be improved for the 5 percent to 23 percent of hazardous wastes which are treated off the premise of the generator. Local manufacturers may be able to save waste transportation costs and thus be somewhat more competitive. H.W.M.F., however, locate toward their markets, rather than the waste generators being drawn toward a disposal site. Of itself, a H.W.M.F. cannot be expected to draw additional economic activity near it.

APPENDIX G
CONTACTS

TABLE OF CONTENTS

Page

Ministry of Revenue G-1

Ontario Hydro G-2

Area and Regional Municipalities G-2

APPENDIX G

CONTACTS

The following are the persons contacted by phone, letter or interview during Phase 4A of the site selection process as part of the economic base impact analysis. The list is divided as follows: Ministry of Revenue; Ontario Hydro; and area and regional municipalities.

MINISTRY OF REVENUE

E. Winter, Director, Field Operations Branch, Oshawa; September 8, 1983, December 13, 1983, July 11, 1984, September 6, 1984 and April 10, 1985.

Mr. Nicholson, Property Assessment, Region No. 13, Durham; December 15, 1983.

Mr. Clark, Property Assessment, Region No. 18, Niagara; January 4, 1984.

D. Elliot, Property Assessment, Region No. 18, Niagara; January 4, 1984.

Mr. Bertrand, Property Assessment, Region No. 19, Hamilton-Wentworth; July 11, 1984.

D. Rossier, Property Assessment, Region No. 18, Niagara; July 16, 1984.

W. Thompson, Property Assessment, Region No. 15, Halton-Peel; August 2, 1984.

G. deJong, Property Assessment, Region No. 15, Halton-Peel; October 2, 1984.

ONTARIO HYDRO

A. Quinn, Supervising Community Studies Planner; September 8, 1983, December 16, 1983, December 20, 1983, August 14, 1984 and January 2, 1985.

W. Osborne, Community Studies; December 20, 1983, March 14, 1985, March 18, 1985 and April 10, 1985.

J. Boyer, Community Studies; August 3, 1984.

W. Dee, Property Officer; July 30, 1984.

H. Hawes, Community Studies; May 20, 1985.

G. Knight, Labour Relations; October 14, 1983.

M. Hanley, Community Studies; October 13, 1983.

AREA AND REGIONAL MUNICIPALITIES

J. Killins, Clerk, and R. Mens, Treasurer, Township of West Lincoln; August 1, 1984 and July 11, 1985.

J. Collinson, Chief Administrative Officer, City of Niagara Falls; November 5, 1984.

F. Walsh, Chief Administrative Officer, S. Mowder, Treasurer, and C. Eidt, Director of Engineering, Region of Niagara; August, 13, 1984.

W. Holman, Research Director of Public Works, Region of Niagara; July 10, 1985.

R. Main, Chief Administrative Officer, Town of Milton; September 5, 1984.

D. Perlin, Chief Administrative Officer, J. Rinaldo, Treasurer, and G. Woodburn, Manager of Waste Disposal, Region of Halton; November 28, 1984 and July 12, 1985.